# THREE ESSAYS ON AGGLOMERATION, STRATEGIC ORIENTATION, AND ORGANIZATIONAL FORM

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by

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

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presented by Shih-Chuan Lin,

a candidate for the degree of Doctor of Philosophy,

and hereby certify that, in their opinion, it is worthy of acceptance.

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# THREE ESSAYS ON AGGLOMERATION, STRATEGIC

# ORIENTATION, AND ORGANIZATIONAL FORM

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## ABSTRACT

This dissertation consists of three essays, trying to fill a gap in the literature by exploring the interaction of agglomeration, ownership structure, and strategic orientation. Much research has been focused on each perspective of issues, but little work has been done on the outcomes from the interaction.

The first essay focuses on how the effect of franchising influences the performance of hotel segments across all identifiable hotel chain locations in the United States. This essay analyzes the effect of franchising in the aggregate, controlling for brand quality segments, or service levels, as well as each individual quality tier. In addition, this essay examines the effect of franchising both with and without controls for the endogeneity of the franchise treatment decision. First, the findings indicate that franchised-ownership is associated with higher performance outcomes among hotels both with and without controlling the endogenous selection. Second, the results imply that the effects of franchising and multi-unit franchising have differential benefits based on the product quality attributes of the establishments, and suggest that previous studies examining franchising way have overlooked these differences.

The second essay presents the joint choices of geographic location and product positioning in the Texas lodging industry. The literature on the two-dimension Hotelling model concludes that firms choose to maximally differentiate on the dominant char-

acteristic and minimally differentiate on the dominated characteristic. I argue that, assuming the geographic location is the dominant characteristic and the product positioning is the dominated characteristic, the model implies that multi-unit owners will structure their portfolios of establishments to be geographically differentiated while choosing less differentiated brands. Alternatively, I argue that, if the geographic location is the dominated characteristic and the product positioning is the dominant characteristic, the model implies that multi-unit owners will locate their establishments near one another in a geographic space while choosing highly differentiated brands. The empirical findings indicate a max-min (min-max) equilibrium, which provides insights into the strategic motivations of multi-unit operators and the relative dominance of place versus market position in those decisions.

The third essay analyzes how product market strategy and ownership structure influence the evolution of the cluster. Using the data from the Texas Comptroller of Public Accounts from 2010 to 2016, this study focuses on how the joint effects of product market strategy and ownership structure shape the lodging industry dynamics and eventually the spatial distribution of hotels. The literature on agglomeration claims that the agglomeration effect is heterogeneous among hotels and this effect is based on product heterogeneity between entrants and incumbents nearby. In addition, the choice of the ownership structure of entrants might substantially change the competitive environment of the market. This research proposes that multi-unit owners who operate a bundle of product portfolios can obtain more benefits but neutralize more threats from agglomeration. The results show that the multi-unit owner will establish a new high-end hotel in the market characterized by high counts of low-

end hotels if one of the incumbents belongs to the multi-unit owner. Moreover, the findings also show that multi-unit owners who operate multiple cross-tier/same-chain hotels will neutralize the negative externality from agglomeration. The results imply that the owner of high-end hotels may find it beneficial to control nearby incumbents.

# Chapter 1

# Introduction

U.S. hotel companies create 8 million jobs, generate $483 billion in guest spendings and $167 billion in taxes, and contribute $590 billion to the U.S. GDP (American Hotel & Lodging Association, 2015). There are more than 54,200 properties and 61 percent of hotels – more than 33,000 properties – are small businesses (U.S. Hotel Small Business Ownership Study, 2015). The ownership structures of hotels are diversified. Some are operated by company owners, some franchise to local owners, and others work as membership cooperatives. Moreover, hotels provide different quality levels of the product and service based on the segment tiers. The competition among hotels is local because very few hotels believe they have more than four or five competitors in the local markets (Kalnins, 2006) and so hotels can enjoy some market power because there exist search costs for consumers to find rivals' prices.

Because of the specific market structure that there are few competitors in the local market where brings consumers limited choices for their stay, the concentration in the local market may be higher than they expect because nearby hotels with different brands may be owned or operated by the same owners. Multi-unit owners not only operate multiple hotels but also compete against each other in more than one market. Empirical studies have concluded that multi-unit ownership leads to

higher survival rates for hotels (Ingram and Baum, 1997a, 1997b) and for fast-food restaurants (Kalnins and Lafontaine, 2004) because they can transfer detailed local knowledge across their establishments (Darr et al., 1995). It would be an interesting question to examine the relationship between multi-unit owners' strategies and their strategic outcomes in the U.S. lodging industry because multi-unit owners have incentives to gain the most from the loosened competition.

This dissertation presents research on issues of agglomeration, product differentiation and ownership structure in economics, and in particular, considers the relationship between strategic patterns and strategic outcomes in the U.S. lodging industry. Figure 1.1 below shows a complete road-map of my research, including the interaction of agglomeration, firms' heterogeneity, and performance outcome. The U.S. lodging industry is an ideal setting to examine the relationship for several reasons. First, hotels compete in a large number of geographic markets. Second, the location pattern of hotels is not randomly distributed. Third, not just hotel chain companies have multiple hotel brands across geographic markets, but multi-unit hotel owners operate multiple hotels in different markets. Finally, one can accurately capture heterogeneity in product quality among hotels based on their segment tiers.

More specifically, this dissertation focuses on the competitive behavior/strategic orientation of firms operating in multiple markets, analyzing how firms reduce competition through anti-competitive practices and retain their dominant position in the market. However, firms usually neither produce a single product nor operate a single unit. When firms operate their establishments in more than one market, their actions in each market are affected by the reaction of their competitors across all markets.

In this dissertation, I study the firms' optimal course of actions in multiple markets and derive their efficiency implications.

**A firm's heterogeneity**
- Multi-market contact
- Product segment
- Strategic orientation
  - Horizontal differentiation
  - Vertical differentiation
- Ownership structure

**Level of Agglomeration**
- Positive externality
- Negative externality

**Strategic outcomes**
- Location decision
- Performance
  - RevPAR
  - Efficient score
  - Survival rate
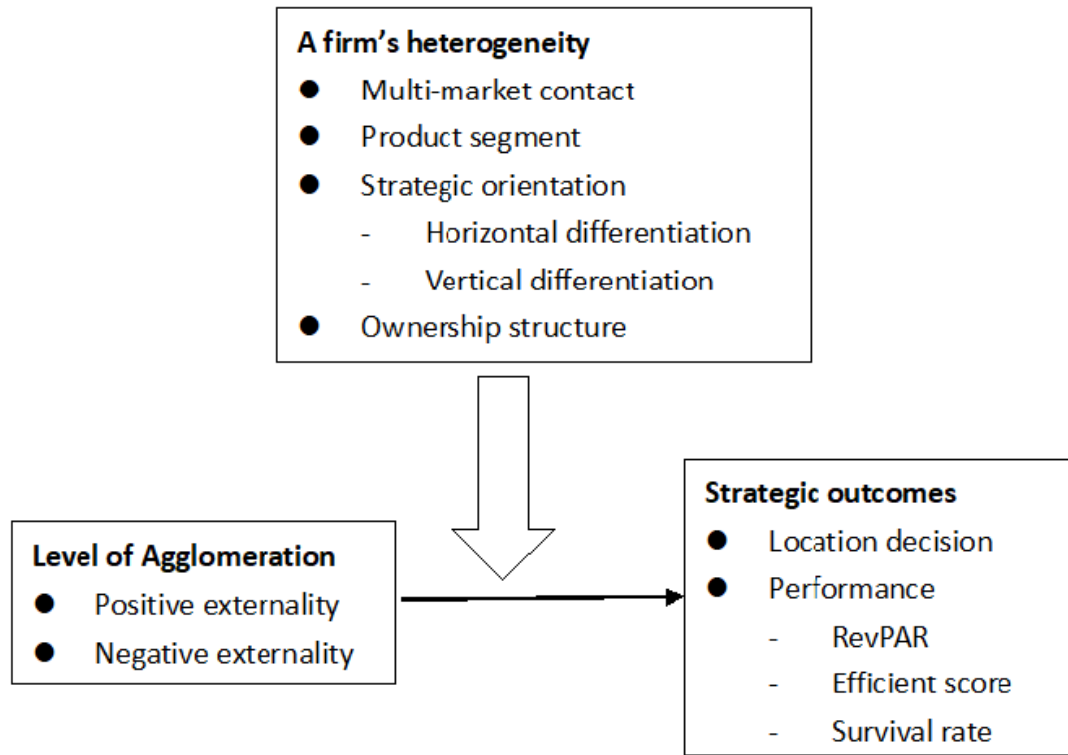
Figure 1.1: Research road-map

## 1.1 Literature review

### 1.1.1 Product differentiation

The two main objectives of organizations are to achieve ompetitive advantage positions and to enhance their organizational performance relative to their competitors. A firm can perform better by differentiating its product or service from its competitors. Differentiated products can improve firms' competitive advantages, for example, by lowering the product cost or improving the product quality (e.g. Porter 1980, 1985). A lower cost structure or a higher product quality increases the competitive advantage, which induces a better performance. According to Barney (1991), competitive

advantage is defined as one firm having a relative advantage to its competitors. The competitive advantage exists when one firm is able to provide the same product or service as its competitors, but at a lower cost or to provide the product or service better than its competitors. Previous studies have shown the significant relationship between competitive advantage and organizational performance (Ma, 2000). Achieving a superior position of competitive advantage is a necessary condition in order for the organization to outperform (Barney, 1991) and the competitive advantages result from, for example, operational efficiency, diversification or ownership structure. Studies have measured competitive advantages as different factors. Porter (1996) views competitive advantages as having a cost advantage, a differentiation advantage, or a focus advantage. Chenhall and Langfield-Smith (1998) measure product differentiation as being to provide high-quality products or fast deliveries, to make changes in design, to introduce new products, to provide unique product features. Morgan et al. (2004) measure product differentiation by providing a higher product quality, packaging, design, and style. Abu-Aliqah (2012) measures product differentiation as a higher product quality, a fast delivery, design or new products, and unique product features. Thus, the diversification above implies that firms obtain competitive advantages from their competitiors, and, in turn, enhance the performance outcomes.

Firms compete for customers by providing them superior value positions that are defined as the maximum the customer is willing to pay for the product attribute minuses the price actually paid. Firms can improve the value positions by increasing product and service offerings, quality, and other dimensions valued by customers. The critical difference determining business success or failure is the sources of competitive

advantages. One can say the product and service are more substitutes as the degree of product differentiation between firms is smaller. In the lodging industry, customers differentiate hotel brand names because of brand loyalties, which enable hotels to distinguish their product and service offerings from their competitors, to enhance their performance, to exert greater efforts to distribute the brand, and to command premium prices over their competitors (Tavitiyaman et al., 2011). Product quality becomes a major factor on differentiation in order to satisfy consumers' tastes (Shammot, 2011). For example, consumers are willing to pay more for products or services based on their individual size, taste, style, need or expression. Achieving competitive advantages through product differentiation becomes one of the main factors to obtain a higher performance. In general, many substitutes generate restrictions on firms' abilities to raise prices. Hence, product differentiation enhances firms' competitive advantages, which in turn affect their performance outcomes.

## 1.1.2   Ownership structure

U.S. hotel companies either own hotels operated by managers or franchise to individual operators. The incentive between managers and franchisees and the objective are very different, which might lead them to put different levels of efforts that could influence the outcomes. The theoretical principle-agent model suggests that the higher-powered incentive of franchisees will obtain a higher demand and a lower average cost in franchised establishments than in company-owned establishments. On the other hand, however, franchisees may have incentives to be free riders on the value of the brand, which might lead to a lower quality level of establishments and thus a lower demand or a higher price in franchised establishments.

One of the primary reasons why the empirical study on franchising emerges is to deal with the puzzle obtained in the theoretical agency theory, which includes moral hazard problems and transaction costs (Lafontaine and Slade, 2007). Principals have difficulties in observing agents' behavior. One agent will have an incentive to shirk because her interests are not aligned with the principal's interests. As a monitoring cost is high and when the local information is important, the incentive increases its importance. Franchising reduces agency costs between franchisors and franchisees (Lafontaine and Blair, 2005). One would expect that franchised establishments would be more efficient than company-owned establishments operated by managers because the compensation of franchisees is directly tied to the performance of establishments. It is important to acknowledge the significant differences in the incentive and objective between franchisees and franchisors, which can imply heterogeneous effects of owership strucure on the performance.

To reduce the performance differences between franchisees and franchisors, multi-unit franchising has become a popular method to eliminate the shirking problem because high-ability or more experienced franchisees are more likely to succeed in franchising systems and they would like to operate multiple franchised establishments. Operating multiple establishments increases franchisees' competitive advantages. Moreover, they have good information about the local market and thus they are allowed by franchisors to operate multiple establishments in the local market. Multi-unit franchising can help alleviate the objective misalignment between the franchisor, maximizing the whole profitability of franchising systems, and the franchisee, maximizing her own profit (Lafontaine, 2014). Multi-unit owners reduce the risk of

failure (Bates, 1998), obtain scale economies (Grunhagen and Mittelstaedt, 2002), favor system uniformity (Weaven and Frazer, 2007), enhance the ability to coordination (Weaven and Frazer, 2004) and have higher administrative capabilities (Grunhagen and Mittelstaedt, 2002). The multi-unit system ensures the owner better competitive advantage and improves its performance outcome.

### 1.1.3 Agglomeration

Location is also clearly considered as an important determinant of firm performance and as one of the primary factors on performance. If we treat product differentiation and ownership structure as the factors within the boundaries of organizations to influence the performance outcome, the location choice can be defined as the factor outside the boundaries of organizations but also influences the performance outcomes. Studies have examined the effect of agglomeration in different industries (Chung and Kalnins, 2001; Konishi, 2005; Ridley, 2008; Rosenthal and Strange, 2001, 2003). Firms have strong incentives to locate close that allows them to enjoy a number of benefits from clustering with other firms, increasing their ability to share infrastructure and input (Rosenthal and Strange, 2001, 2003).

The agglomeration literature provides demand and supply factors affecting firms' incentives to the cluster. On the demand side, firms cluster due to being located near consumers who might be attracted by the marketing or reputation of their competitors (Chung and Kalnins, 2001), attracting consumers to search for optimal product characteristics (Konishi, 2005), or providing credible commitments to low prices (Dudey, 1990). However, agglomeration may also increase price competition. Price competition can be mitigated via differentiating product and service offerings (Dranove et al,

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2003; Fujita and Thisse, 2002). If firms can offer consumers differentiated products, then they can enjoy the benefits of agglomeration without harming from the intense price competition. Thus, agglomeration enhances demand externalities when firms involve goods or services requiring more visual inspection or when goods or services are highly heterogenous.

The theoretical studies on location choice are more supportive of dispersion by firms that have incentives to avoid price competition (Irmen and Thisse, 1998), but the empirical studies tend to find more evidence of agglomeration (Elizalde, 2013; Iyer and Seetharaman, 2008; Thomadsen, 2007; Watson, 2009). Baum and Haveman (1997) find that new hotels tend to locate geographically close to the incumbents who have different occupied capacities. Kalnins and Chung (2004) show that the presence of higher quality hotels in a market increases the likelihood of new hotels choosing the location. Canina et al. (2005) find that hotels are related to higher performance outcomes as the increases in higher product differentiation in a cluster. Thus, one could expect the significant relationship between product heterogeneity and agglomeration.

## 1.2 Research questions and contributions

This dissertation draws on three related themes in the literature above. Agglomeration theory suggests that, under certain circumstances, firms will outperform if they collocate together because the agglomeration effect dominates the competition effect. Product diversification leads firms to higher performance outcomes because diversification can reduce direct price competition with other competitors. The multi-unit system ensures better competitive advantage and more flexibility for firms to react to

market uncertainties and, in turn, improves their performance outcomes. However, we are unaware of any research that examines the interactions or joint effects of these three facets, particularly at the establishment level.

Several potential research questions are addressed through the development of the interdependencies of geographical location, strategic orientation, product differentiation, and ownership structure. What if the market structure changes when multi-unit owners take different strategic orientations? Do different strategic orientations adopted by multi-unit owners influence the characteristic of agglomeration? Does the product pattern of multi-unit owners affect their location choice? Under what conditions do multi-unit owners have incentives to collocate together? In what situations do multi-unit owners locate as far away as possible from each other? Do the choices of ownership structure and product market strategy influence the performance outcomes? This dissertation tries to answer these research questions.

To better understand these relationships, this dissertation explores the specific research questions as follows.

**Research question 1:** How does the effect of franchising on performance vary based on the brand tier?

**Research question 2:** What is the relationship between multi-unit owners' choices of product portfolio and geographic location?

**Research question 3:** How does the ownership structure affect the likelihood of the entry pattern of hotels?

**Research question 4:** How do multi-unit owners' product strategies influence/change the market structure of the cluster?

In Chapter 2, I explore how the effect of franchising influences hotel performance. One of the primary motivations for franchising is to reduce monitoring and agency costs between the franchisor and the manager of the local establishment. This study uses the establishment data from the Census of Retail Trade (CRT) and the Survey of Business Owners (SBO), as well as contextual public data from the American Community Survey (ACS), to examine the effect of franchising on hotel performance across all identifiable hotel chain locations in the United States. This research examines the effect of franchising not only in the aggregate but also for each individual quality tier, as well as the effects both with and without controls for the endogeneity of the franchise treatment decision. First, the results show that franchised-ownership is associated with higher performance outcomes among hotels both with and without controlling the endogenous selection. Second, the findings indicate that the effect of franchising on hotel performance varies based on the quality segment of hotels. Franchising is associated with positive performance benefits for midscale and upper midscale hotels, no significant effect among upscale hotels, but negative performance effects among economy and luxury hotels. In addition, the effects of multi-unit franchising are negative for economy and midscale hotels, but positive for upper midscale hotels and insignificant for upscale and luxury hotels. The results imply that the effects of franchising and multi-unit franchising have differential benefits based on the product quality attributes of the establishments, and further suggest that previous research examining franchising way have overlooked these differences.

In Chapter 3, this research presents the joint choices of geographic location and product positioning (or brand) by multi-unit operators in the Texas lodging industry

using the data from the Texas Comptroller of Public Accounts from 2010 to 2017. The literature on the two-dimension Hotelling model concludes that firms choose to maximally differentiate on the dominant characteristic and minimally differentiate on the dominated characteristic. I argue that, assuming the geographic location is the dominant characteristic and the product positioning is the dominated characteristic, multi-unit owners will structure their portfolio of establishments to be geographically differentiated while choosing less differentiated brands. Alternatively, I argue that, if the geographic location is the dominated characteristic and the product positioning is the dominated characteristic, multi-unit owners will locate their estanlishments near one another in a geographic space while choosing highly differentiated brands. This chapter offers a test of the prediction using unique and detailed multi-unit owner level data from the Texas lodging industry. The results are consistent with the theoretical prediction from the two-dimension Hotelling model, which implies a max-min equilibrium. Multi-unit owners who operate multiple cross-tier/same-chain hotels have 190.97 miles more close to the member hotels. The results provide insights into the strategic motivations of multi-unit operators and the relative dominance of place versus product positioning in those decisions.

In Chapter 4, this study examines the joint effects of product differentiation and ownership structure on the evolution of the cluster in the Texas lodging industry. Using the data from the Texas Comptroller of Public Accounts as well as the American Community Survey (ACS) and the County Business Patterns (CBP) in 2010-2016, this research focuses on how the joint effects of product positioning and ownership structure shape industry dynamics and eventually the spatial distribution of

hotels. The agglomeration literature claims that the agglomeration effect is heterogeneous among hotels based on product heterogeneity between entrants and incumbents nearby. In addition, the choice of the ownership structure of entrants might substantially influence the competitive environment of markets. This chapter proposes that multi-unit owners who operate a bundle of product portfolios can obtain more benefits but neutralize more threats from agglomeration. First, the results show that the multi-unit owner is more likely to establish a new high-end hotel in the market characterized by high counts of low-end hotels as long as one of the incumbents belongs to the multi-unit owner. Second, the findings indicate that the multi-unit owner who operates multiple cross-tier/same-chain hotels is more willing to establish a new high-end hotel in a market characterized by a high count of low-end hotels if one of his hotels exists in this market. The results imply that the control of nearby incumbents avoids activities that diminish the value of the entrant of the high-end hotel in the vicinity.

# Chapter 2

# The effect of franchising on the performance of hotel segments

## 2.1 Introduction

Franchising is an important business form in retail and service industries, especially in the U.S. lodging industry. According to the U.S. Census Bureau, the total number of hotels is up to 63,833 establishments, the number of rooms is approximate 5 million guest rooms, the total number of employments is around 20 million and hotels contribute $195 billion to the U.S. communities in 2012. It ranks as one of the top 10 largest industries in the United States. In addition, the International Franchise Association (IFA) states that approximate 26,000 lodging establishments are administrated through franchising, which, in 2012, accounts for $79 billion. These franchised esablishments have become a ubiquitous part of our life today, indeed, suggesting that business owners value the benefits from franchising as an efficient business model.

Why do firms choose to organize themselves as franchised companies? Generally speaking, for the members of chains, they can benefit from the lower costs through bulk purchasing programs and, more important, to obtain scale economies in production, new product development, or advertising. They can also benefit from the

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experienced franchisors who share knowledge and provide notable information on how to be successful. The combination of the capacity of franchising and chains' competitive advantages creates brand recognition and captures economies of scale. For consumers, they can purchase goods with a similar quality standard in the establishments within the same chain. Their increased reliance on brand names has played a significant role in the development of retail and other chains.

Agency theory claims that franchisees have stronger incentives to operate the establishments more efficiently than the manager of the establishments owned by franchisors. Franchising reduces the agency costs between franchisors and franchisees (Lafontaine and Blair, 2005). When a monitoring cost is high or when the local information is important, the incentive increases the importance. Thus, one would expect that franchisee-owned establishments would be more efficient than franchisor-owned establishments operated by the managers.

Dual distribution, a mix of company-managed establishments and franchised establishments, is likely to become more prevalent in the case of service and retail chains (Brickley and Dark, 1987; Kalnins, 2004; Kalnins and Mayer, 2004; Lafontaine and Bhattacharyya, 1995). The coexistence of the both types of businesses in the marketplace further suggests that neither form of business ownership clearly dominants the other. On the other hand, the implication of dual distribution is that motivations and incentives may systematically vary based on the form of distribution, even for identical goods or services of the same brand. From the theoretical perspective, one of the primary motivations for chain owners to use franchising is that it reduces monitoring and agency costs between the franchisors and the managers of local es-

tablishments. The question of whether franchised establishments are more likely to be more superior than company-owned establishments is ambiguous. This research provides findings to fill the gap in the franchise literature.

Most studies have examined this question at the industry level. However, there is relatively little research on the effect of franchising on performance at the establishment level. Particularly in the lodging industry, most research has focused on the ownership mix (the percent of franchised establishments) of the chain and overall chain performance (e.g., Botti, et al., 2009). A notable exception is Kosova et al. (2013), who use the establishment data from one family of hotel chains to examine the effect of franchising. They find that, while there appears to be a positive correlation between franchisee-ownership and establishment performance, even when controlling for other establishment characteristics, the effect of franchising is not significant when using an instrumental variable approach to control for the choice of ownership structure (franchisees or franchisors). The authors suggest that the parent organization "chose correctly" in its decision of which establishments to franchise. It is ambiguous, however, whether this result is unique to this franchisor or if there may be other factors that the authors do not address, such as potential heterogeneity across types of hotels (or hotel brands) within the system.

Previous studies have implicitly assumed a constant franchise effect across all levels of product/service quality by pooling the different quality segments of establishments in their analyses (Celen and Thomas, 2009; Kosova, et al., 2013; Vroom and Gimeno, 2007; Zhang, et al., 2015). However, none of these studies considers the possibility that the relationship between ownership structure and performance may

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vary based on firm-level attributes such as brand quality. Generally speaking, the possibility that positive and negative franchising effects may coexist within the same industry–if at different tiers of quality–does not appear to have been considered in the literature.

Sveum and Sykuta (2019) study the effect of franchising on restaurants and find that franchising has a differential effect based on the level of service that restaurants provide. Namely, franchisee-ownership is associated with a higher productivity or efficiency in full-service restaurants, but has no significant effect in limited-service restaurants. They argue that this result reflects the differences in the value of local information and managerial incentives between these two types of establishments. Previous literature has suggested that managerial incentives are likely different based on the brand service level (or quality tier) of hotels (Kalnins, 2017). Value drivers and decision-making are different for those hotels that offer more comprehensive amenities. Business models affect firms' possibilities to create and capture values. The contingent superiority of one governance structure over the other bases on its fit with the strategy. Franchised establishments with their more flexible and decentralized structures are more likely to pursue the strategies that emphasize flexibility and local adaptation, while company-owned establishments will tend to pursue the strategies that emphasize predictability and control. Hence, this study proposes and tests the hypothesis that the effect of franchising on the establishment performance based on brand quality.

This study uses the establishment-level data from the Census of Retail Trade (CRT) and the Survey of Business Owners (SBO), as well as contextual public data

from the American Community Survey (ACS), to examine the effect of franchising on hotel performance across all identifiable hotel chain locations in the United States. The CRT includes the information of hotels on payroll, the number of rooms, sales, and ownership characteristics. We control for the differences in the quality, or amenity level, of hotel brands using hotel brand service levels (e.g., "economy", "midscale", "upper midscale," "upscale", "luxury") defined by STR Global, a lodging industry research organization, by matching business name responses with the STR Global classification list. This research examines the effect of franchising in the aggregate, controlling for brand quality, as well as the same model for each individual quality tier. As noted in the literature (e.g., Kalnins, 2017; Kosova, et al., 2013), one needs caution as analyzing the effect of franchising because the decision to open a franchised business is not random. The factors that affect the franchising decision may also influence performance. One must find a way to control for the selection of franchising when examining whether franchising has a direct impact on performance. As a result, this research, following Kosova, et al. (2013), estimates the effects both with and without controls for the endogeneity of the franchise treatment decision.

Different from the findings in Kosova, et al. (2013), this study obtains that franchisee-ownership is associated with a higher performance outcome among hotels with and without controlling the endogenous selection. The other findings indicate that the effect of franchising on hotel performance varies based on the firm-level attribute, that is, brand quality. Franchised establishments are associated with positive performance benefits for midscale and upper midscale hotels, however, there is no significant effect among upscale hotels, although negative performance effects

among economy and luxury hotels. In addition, the effects of multi-unit franchising are negative for economy and midscale hotels, but positive for upper midscale hotels and insignificant for upscale and luxury hotels. The results imply that the effects of franchising and multi-unit franchising have differential benefits based on the product quality attributes of establishments. The heterogeneous effect on franchising exists in one industry. The results suggest that previous research examining franchising way has overlooked these differences.

This chapter is organized as follows. In the next section, the literature will be reviewed. In section 3, the theoretical background and the hypotheses will be developed. In section 4, the data and some summary statistics will be described to illustrate the research. In section 5, the empirical approach and results will be presented and analyzed to example the effect of franchising on hotel performance in the U.S. lodging industry. Then, this study will conclude by summarizing the key findings and implications in section 6.

## 2.2   Literature Review

### 2.2.1   Franchising

Franchising is a common business strategy that allows franchisees to use the logo, trademarks, operation systems, standards, services, and other franchisors' resources in a proscribed territory (Enz, et al., 2013). Franchisees purchase both strategic and operational supports from franchisors in the franchising arrangement. Most franchise chains simultaneously use franchised and company-owned establishments. Lafontaine and Shaw (2005) assert that franchise chains franchise 85 percent of their establishments, while the remaining 15 percent are company-owned establishments.

Agency theory argues that the choice of ownership structure between franchising and company-owned ownership is affected by agency costs (Brickley and Dark, 1987; Caves and Murphy, 1976; Jensen and Meckling, 1976; Lafontaine, 1992). Shirking is a major hazard associated with company-owned ownership because the compensation of managers is a fixed salary. They have limited incentives to perform efficiently. A key advantage of franchising is that the compensation of franchisees is directly tied to the performance of their establishments. They are less likely to shirk than the managers of company-owned establishments. Thus, the performance of establishments operated by franchisees is better than that by managers.

The literature suggests that franchising is superior to company-owned ownership because it helps firms grow faster and minimize monitoring costs, especially in remote locations where the monitoring costs incurred by managers are high (Brickley, et al., 1991; Jensen and Meckling, 1976; Norton, 1988a, 1988b; Shane, 1996). Franchising in the retail and service business needs to establish many geographically dispersed establishments to reach customers. It makes a difficulty for franchisors to know what is happening at the local market and so enlarges the monitoring costs. In addition, franchising reduces the problems of adverse selection and moral hazard resulting from the separation of ownership and control, and, in turn, enhances performance (Shane, 1996). Franchisees have rights to claim residual profits and, therefore, they are more motivated to pursue superior performance through efficient decision making than the managers who operate company-owned establishments (Brickley and Dark, 1987). Franchisees are more sensitive to the conditions in the local market and the financial performance of local establishments. However, there are few studies that assess the

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performance differences of franchised versus company-owned governance structures directly at the establishment level. There may be significant heterogeneity not only in the performance outcomes but also in the strategies and structures.

Competition is greater among franchised establishments than among company-owned establishments because franchisees select prices without considering the joint profits of the franchisors of the same chain in a given area (Conlin, 2004). Franchisees not only are more motivated to face challenges and work hard but also are more flexible and have more autonomy to carry out what they intend to do than their company-owned counterparts (Brickley and Dark, 1987) because the degrees of control and monitoring from franchisors and the scope of decision-making rights for franchisees are quite different (Sveum and Sykuta, 2019; Yin and Zajac, 2004). However, the incentive of high-powered franchisees has the detrimental effect from increasing free riding problems. They may increase the short-run profitability by free riding on the effect of franchisors or other franchisees. For example, they may lower quality standards, fail to supervise employees, or invest less in local advertising (Brickley and Dark, 1987). Franchise chains with a higher valuable brand name are particularly vulnerable to free riding hazards. When franchise chains have higher values on brand name, franchisees can obtain more from providing a lower quality product or service than customers' perceived expectation (Michael, 2000).

The market where the same franchisee owns multiple properties differ from those markets where different franchisees own the properties and/or where properties operated by single-unit franchisees are closer substitutes. For the franchised chains, the losses to incumbents due to same-brand entries are significantly greater than the

losses associated with new same-tier/other-brand hotels because each franchisee does not consider how her price influences the franchisor's other establishments (Kalnins, 2004). Moreover, franchised establishments affiliated with the same brand and located in the same market are closer substitutes than company-owned establishments because franchisors often have incentives to decrease the price competition and, in turn, allows them to extract greater fees from franchisees (Conlin, 2004; Kalnins, 2004). Franchisees' objectives are to maximize the profits of their own establishments without considering others operated by franchisees or franchisors within the same chain and, in turn, the increased competition occurs. In contrast with Franchisees' objectives at the establishment level, franchisors' objectives are at the chain level. The franchisors can decrease the level of price competition among franchised establishments by threatening not to renew the franchise agreement or terminate the agreement or can directly influence the level of competition by advertising a price. Kandori and Matsushima (1998) demonstrate that decreasing franchisors' monitoring costs and increasing communication between franchisees are useful actions to decrease in price competition.

Franchising improves the operator's incentive, but the nature of the franchise relationship creates other conflicts between franchisees and franchisors. Dishonest franchisors can collect fees from franchisees but provide little support in return (Hoy, 1994). Franchisees have incentives to free ride on the franchisor's brand-building efforts that franchisees can cut quality in their establishments (Michael, 2000), thereby increasing their own margins but damaging the franchisor's brand name (Caves and Murphy, 1976). In service-type chains, it is difficult for chain operators to guarantee

quality. Agency theory views franchising as a trade-off between the monitoring costs and free riding risks (Lafontaine, 1992). However, the evidence on the question of whether there are differences in outcomes between two types of establishments remains mixed. To shed more light on this issue, this study explores whether differences in ownership structures lead to differences in performance outcomes, which is measured by the standard outcome variable used in the hotel industry: revenues per available room (RevPAR).

### 2.2.2 Franchising/product market strategy fit and performance

Franchising has been recognized as a useful business model to enhance performance by reducing the separation of ownership and control and subsequently reducing the problems of adverse selection and moral hazard (Shane, 1996). Some studies have concluded that company-owned hotels have higher performance in more concentrated markets than franchised hotelts because company-owned hotels benefit more from concentration increases (Vroom and Gimeno, 2007). Other studies have focused on the advantages to the chain of having a mixture of franchised and company-owned structures (Lafontaine and Kaufmann, 1994) and the optimal franchised ratio in a chain level (Bradach, 1997; Botti, et al., 2009). A possible reason why this result may be inconsistent is that the empirical studies do not analyze the performance differences of direct competitors that are similar in characteristics and are subject to the same competitive conditions in the same local market (Carvell, et al., 2016). There are few studies on the possible contingent superiority of one governance structure over another based on its fit with the strategy pursued by that entity at an establishment level. For

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example, company-owned hotels have higher prices within high-end segments, whereas franchisees price higher in the lower tiers (Kalnins, 2017). The study of business models is an important topic because business models affect firms' possibilities to create and capture values (Amit and Zott, 2001). Product strategies are also chosen to increase value creation and value capture. For example, Carvell, et al. (2016) find the brand-affiliated hotels with the upscale segment perform better in the primary markets. However, business models and product strategies are complements (Zott and Amit, 2008). The choice of business model and product strategy might affect the performance of firms (Zott and Amit, 2008).

Some studies have focused on the retail and service industry, such as fast food restaurants. Yin and Zajac (2004) argue that the performance differences between franchised and company-owned governance structures may be attributed more to the matching of one structure with a correspondingly appropriate strategy. Franchised establishments with their more flexible and decentralized structures are more likely to pursue the strategies that emphasize flexibility and local adaptation, while company-owned establishments will tend to pursue the strategies that emphasize predictability and control. Franchised restaurants tend to use more complex mixed strategies (i.e., dine-in, take-out, and delivery) while company-owned restaurants tend to pursue simpler strategies (only take-out and delivery). In addition, franchised restaurants with a mixed, more complex strategy significantly improve the performance while company-owned restaurants have far superior performance when they are pursuing the pure, simple strategy. Sveum and Sykuta (2019) analyze the effect of franchising on performance in terms of full- and limited-service restaurants. They find that franchised

and company-owned restaurants have no statistical difference on performance in limited service. However, franchised restaurants perform better than company-owned restaurants in full-service. The authors argue that the differing effect of franchising between these two product segments is due to the differences in the information needs and managerial roles between these two segments. The effect of franchising is stronger when local information and managerial discretion play a larger role in the business operation.

Carvell, et al. (2016) compare the performance differences of brand-affiliated and unaffiliated hotels, without regard to the ownership structure. Using the RevPAR as the performance measure, they find that brand-affiliated upscale hotels significantly outperform unaffiliated upscale hotels in primary markets, but do not find performance differences for other segments. Kosova, et al. (2013) find that, while there appears to be a positive correlation between franchisee-ownership and performance, even controlling for other establishment characteristics, the franchising effect is not significant when using an instrumental variable approach to control for the choice of ownership structure (franchisees versus franchisors). The authors suggest that the parent organization "chose correctly" in its decision of which establishments to franchise. While Kosova, et al., do control for hotel attributes, they do not consider or control for brand or quality service tiers directly. None of these studies considers the possibility that the relationship between performance and ownership structure may vary based on firm-level attributes such as brand quality in the lodging industry. More generally, the possibility that positive and negative franchising effects can coexist within the same industry—if at different tiers of quality—does not appear to

have been considered in the literature. This study presents the argument that brand quality is likely to be an omitted moderating variable that helps explain these mixed findings.

In addition, strategic choice is often endogenous to expected performance (Shaver, 1998). The decision to open a franchised business rather than a company-owned business is not random. The factors that affect the franchising decision may also influence the establishment performance. Chakrabarty, et al. (2002) and Martin (1988) argue that franchisors select the least risky and most profitable establishments for themselves. Moreover, franchise chain executives have stated that they sometimes open multiple establishments simultaneously in the same large marke and that the combination of franchising and company management may be required to accomplish this, as a result of both parties' limited resources (Bradach, 1997). Franchisors might select company management for sites within the market where they believe that they will be successful in the long term but no franchisees are willing to invest in at the time opening. As a result, this research tests the endogenous selection problem of the franchising decision.

## 2.3   Theoretical Background and Hypotheses

### 2.3.1   Franchisees and franchisors

Franchising is the contractual relationship between franchisors and franchisees. Agency theory argues that the choice between franchising and company-ownership is affected by agency costs (Brickley and Dark, 1987; Caves and Murphy, 1976; Jensen and Meckling, 1976; Lafontaine, 1992). Shirking is a major hazard problem associated with the managers of the establishments owned by company owners because of the

fixed compensation of the managers. Unlike the fixed compensation of the managers, the compensation of the franchisees is directly tied to the performance of their establishments. They are less likely to shirk. Thus, the performance of the establishments operated by franchisees is better than that by managers.

When franchisors decide a new establishment built in an area, they choose among the existing franchisees to operate the establishments, look for a new franchisee, or operate the establishments by themselves. If one franchisee is chosen, the franchisor works with the franchisee to select the best geographic location for the establishment (Kalnins and Lafontaine, 2004). Franchising is beneficial to establish many geographically dispersed establishments to reach customers becasue franchisees typically live in a local market for a long time. Franchisors face difficulties to know what is happening at the local market, which, in turn, enlarges the monitoring costs. Franchisees tend to be more sensitive to conditions in the local market and the financial performance of the local establishments. Franchising is superior to company-ownership because it helps firms grow faster and minimize monitoring costs, especially in remote locations where the monitoring costs incurred by the managers are high (Brickley, et al., 1991; Jensen and Meckling, 1976; Norton, 1988a, 1988b; Shane, 1996). Based on the argument above, we claim that franchised establishments outperform than company-owned establishments.

**Hypothesis 1.** *The franchised establishment performs better than the company-owned establishment.*

### 2.3.2   The business model and the product market strategy

Franchisor-owned establishments coexist with franchisee-owned establishments in the U.S. lodging industry. This phenomenon contradicts with the existing theories, such as transaction costs explaining on franchising (Williamson, 1991) and on the organization of distribution channels (Anderson, 1985), as well as agency theory explaining on franchising (Lafontaine, 1992), which predict that all firms engaging in the same transaction should choose the same form of governance. However, hotel chains use both company-ownership and franchising, even if the two brands appear to engage in transactions almost identical with respect to frequency, uncertainty, and asset specificity. Business models and product strategies, which affect or increase firms' ability to create and capture values, are complements (Amit and Zott, 2001; Zott and Amit, 2008). We argue that the performance of one governance structure over another based on its fit with the strategy. To evaluate the implication of business model and product strategy on hotel performance, this study considers two business models – franchisees and franchisors – along with the product strategies: extreme and moderate.

**Franchisor-owned establishments with the extreme product market strategy**

Under management, one hotel company may manage/operate the hotels using its own company employees. The parent hotel company handles day-to-day operations and all management decisions at a given establishment, including all personnel, pricing, and other decisions (Kehoe, 1996). The parent company fully keeps control over its establishments and hires the managers who are salaried employees of the parent company. Because of the fixed salary, managers have incentives to comply with

franchisors' standardization, especially for whose hotels belonging to economy and upper upscale tiers. As managers operate the economy hotels, they have no incentives to undertake price cutting because they have no right to make pricing decisions. The franchisor tries to keep prices as steady as possible so that people know what to expect and they want to be known as having the lowest price. The managers usually follow the franchisor's decision in pricing.

Franchisor-owned hotels are more common in the upper tiers and in a metropolis. The capabilities needed for the upper quality tiers, such as sophisticated service, training, and pricing, can be best developed by franchisors. Franchisors sometimes open multiple establishments simultaneously in the same large market. They might select company management for sites within the market that they believe it will be successful in the long term. The hotel parent company has a different pricing policy for upper upscale flagship brand properties. The franchisors will charge higher prices because they desire price distinctions relative to the midscale hotels affiliated with the same franchisors, even if those are owned by different franchisees. They will raise the price so that there is a clear distinction between the upper upscale property and the midscale property. They have a pricing policy of consistency among the upper upscale hotel. As we have argued above, franchisor-owned establishments have a better financial performance as long as undertaking the extreme product market strategy.

**Hypothesis 2a.** *Franchisor-owned establishments with the extreme product market strategy have a higher performance.*

**Franchisee-owned establishments with the moderate product market strategy**

Under a franchise contract, the parent company of hotel brands (the franchisor) grants to an owner (the franchisee) the right to use its brand name. The franchisee has a right to make day-to-day management decisions such as staffing, pricing, and employee pay (Freedman and Kosova, 2014). The franchisee is the residual claimant of the profits from the hotel's operations. Despite the residual claimant status, franchisees may exert less effort in preserving the franchisor's brand name because of the externality among establishments within one given brand. This is because a fraction of their customers often repeats business in other establishments of the same brand, rather than in the same property of the given franchisee (Klein, 1995). Franchisees who are rewarded based on their establishment's profits increase the motivations to save on establishments' costs and to free ride on the brand. This problem will be eliminated if the franchisee operates a moderate product market strategy. As franchisees operate upper midscale hotels, they can comply with franchisors' brand standards (e.g., cleanliness, customer service, hotel ambiance, or the maintenance of amenities). As they choose to lower the brand standards, the upper midscale hotel operated by franchisees might face the competition from the midscale hotels, which have competitive advantages on room price. Thus, the establishment owned by franchisees who undertake the moderate product market strategy has a better performance.

Retail and service businesses need to establish many geographically dispersed establishments to reach customers. While the remote location where the monitoring costs incurred by managers is high (Brickley, et al., 1991; Jensen and Meckling, 1976; Norton, 1988a, 1988b; Shane, 1996), franchising can help minimize monitoring costs.

In most remote areas, the upper midscale hotels have higher probabilities to be operated by franchisees because of agency theory. More importantly, the upper midscale hotels owned by franchisees are usually the highest quality tier in a remote area (Kosova and Sertsios, 2018). The franchisees who operate upper midscale hotels have no incentives to free ride on the investments of the other establishments associated with the same brand because contract termination represents a loss to the franchisees. They have stronger incentives to run their business efficiently.

**Hypothesis 2b.** *Franchisee-owned establishments with the moderate product market strategy have a higher performance.*

## 2.4   The Data

The data are from the U.S. Census Bureau's 2012 Census of Retail Trade (CRT) for all establishments in the hotel, motel, or motor hotel industry (NAICS code 72111). The Census Bureau administers the CRT ever five years to all retail establishments in the United States. Participation is required by law and the Census takes great efforts to ensure compliance. Census micro-level data are protected by law and available to researchers only under strict rules of regulated access and disclosure. From the CRT, we observe the establishment data including revenue, the number of rooms, employee payroll, establishment age, operating name or brand, location information (city, zip code, and county), and the ownership characteristics, including whether the businesses are franchised. These variables enable us not only to examine the effect of establishment characteristics on business performance directly but importantly, to control for the differences between franchised and non-franchised businesses. As described above, because many of the characteristics that affect the decision to buy

a franchise are expected to influence the establishment performance, the estimates of the effect of franchising on performance would likely be biased upward if we do not control for them in our analyses. The estimates could suggest that performance is positively related to franchising and the performance differential may be attributable to differences in the characteristics of the business.

This study is able to construct the performance measure and business characteristics, as well as some additional control variables. For all identifiable brand names, this research creates the quality segment variable based on the quality tier designations provided by STR Global, an industry consulting company. Brand affiliation and franchisee-ownership are used to calculate the percentage of establishments that are franchised in a chain. Using business owner information calculates how many establishments are owned by the same owner and determines whether any individual franchisee is a multi-unit franchising (MUF). Local market characteristics are taken from the 2009 American Community Survey (ACS). The ACS includes Census tract demographic information such as the population and median income. Higher population and/or higher income implies that the hotel is in a busy area, which reflects the potential demand of consumers.

Table 2.1 presents descriptive statistics for all hotels in the final sample. Due to missing data, omitted responses, and non-chain affiliation, the final sample is approximately 6,000 observations within the United States.[1] This table includes summary statistics for total revenues, the number of rooms, brand tier, hotel age, and payroll, as well as whether the hotel is owned by a franchisee (64%) and by a

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[1]Census disclosure rules require sample sizes be rounded and consistent across variables. Disclosure rules also restrict reporting to four significant digits, requiring rounding for some variable statistics.

Table 2.1: Summary statistics for lodging establishments

| Variable (N=6000) | Mean | St. Dev | Meaning |
|---|---|---|---|
| Revenue | 4048 | 11040 | Total revenue; $1000's |
| RevPAR | 22.2 | 17.91 | Revenue per available room |
| Hotel age | 16.35 | 7.54 | Years since the establishment was found |
| Hotel size | 127.8 | 126.9 | Numbers of rooms in the establishment |
| Franchise status | 0.64 | 0.48 | The percentage of franchisee-owned hotels |
| Payroll | 1002 | 3237 | Dollars spent on employees |
| Multi-unit franchising | 0.26 | 0.44 | The percentage of multi-unit franchising |
| Competitors | 4.34 | 6.11 | Numbers of competitors in the same zip code |
| Quality segment | 2.53 | 1.28 | The range of quality is from 1 to 5 |
| Franchised hotels | 0.56 | 0.39 | The percentage of franchised hotels |
|  |  |  | in the same zip code |
| Income | 68630 | 31380 | Average income in a community |
| Population | 5523 | 3470 | Population in a community |

multi-unit franchising (26%). Table 2.1 also includes the data reflecting local market characteristics such as the number of competitors and the proportion of franchised hotels in a market (defined by zip code), population, and median household income.

Table 2.2 provides the summary statistics for the same variables by brand tier segments. STR Global classifies all lodging chain brands into six tiers: economy, midscale, upper midscale, upscale, upper upscale, and luxury. For confidentiality reasons, this study combines the hotels operating in upper upscale and luxury tiers and classifies them as one luxury tier. This table highlights the important differences in the levels of the variables across the hotel tiers. As one might be expected, revenue and hotel size increase with the quality tier, as do revenue per available room and payroll. The degree of franchising also varies across hotel segments, with as many as 82% franchised in the upper midscale tier and as few as 40% in the upscale tier. Large chain companies in the economy, midscale, and upper midscale segments are more

Table 2.2: Descriptive statistics per brand tier and hotel; mean[sd]

| | economy | midscale | upper midscale | upscale | luxury |
|---|---|---|---|---|---|
| Revenue | 1035.00 | 1829.00 | 2487.00 | 4966.00 | 23270.00 |
| | [926.7] | [3481] | [2818] | [4220] | [30580] |
| RevPAR | 12.65 | 16.83 | 21.61 | 30.74 | 55.32 |
| | [6.79] | [10.05] | [10.39] | [12.37] | [34.23] |
| Hotel age | 15.29 | 17.76 | 15.84 | 16.37 | 18.10 |
| | [6.59] | [8.57] | [7.40] | [6.52] | [9.04] |
| Hotel size | 81.06 | 103.60 | 108.00 | 155.00 | 363.30 |
| | [38.62] | [64.15] | [63.87] | [78.18] | [291.40] |
| Franchise status | 0.63 | 0.65 | 0.82 | 0.40 | 0.47 |
| | [0.48] | [0.48] | [0.38] | [0.49] | [0.50] |
| Payroll | 204.20 | 419.40 | 547.20 | 1065.00 | 6526.00 |
| | [205.30] | [1110.00] | [816.60] | [1426.00] | [9011.00] |
| Multi-unit franchising | 0.12 | 0.20 | 0.38 | 0.35 | 0.37 |
| | [0.32] | [0.40] | [0.48] | [0.48] | [0.48] |
| Number of hotels | 1700 | 1300 | 1600 | 900 | 500 |

likely to use franchised establishments and some large chain companies in the up-scale and luxury segments are more likely to rely on franchisor-owned establishments. Multi-unit franchising is similar across all tiers except economy (12%) and midscale (20%). On average, hotels in each quality tier have similar ages from the youngest (15.29 years) to the oldest (18.1 years). These differences illustrate the importance of controlling for quality tier in the regressions.

## 2.5 Empirical Method and Results

### 2.5.1 Model Specification

The goal of this research is to estimate whether franchised hotels have different performance outcomes from company-owned hotels. To do so, this study estimates an empirical model of the following general form.

$$Y_{ijm} = f(F_{ijm}, X_{ijm}, M_{im}, \varepsilon_{ijm}), \tag{2.1}$$

where $i$, $j$, and $m$ index hotel, owner, and market, respectively. $Y$ is revenues per available room (RevPAR).[2] $F$ stands for ownership structure, where each hotel can be either franchised or company-owned. $X$ describes hotel characteristics, including hotel age, hotel size, and quality segment. As Mazzeo (2004) claims heterogeneity in the economic environment affects the decision on franchising, this study also includes market-level characteristics such as the number of competitors and the demographic characteristics such as population and mean income, denoted by $M_{im}$.

In addition, this study also considers whether the hotel is operated by a multi-unit franchisee, which is represented as $MUF$. The equation (2.1) can be modified as follows.

$$Y_{ijm} = f(F_{ijm}, MUF_{ijm}, X_{ijm}, M_{im}, \varepsilon_{ijm}). \tag{2.2}$$

We also run the regressions for each quality tier separately. That is, running the regressions for economy, midscale, upper midscale, upscale, and luxury tiers. The equations (2.1) and (2.2) can be extended to

$$Y_{ijm} = f(F_{ijm}, X_{ijm}, Z_{ijm}, M_{im,}, \varepsilon_{ijm}), \tag{2.3}$$

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[2]In addition to RevPAR, the analysis was also run using data envelopment analysis (DEA) scores in a two-stage model. DEA has been used in many studies examining the relative efficiency (Botti et al., 2009; Hwang and Chang, 2003; Reynolds and Thompson, 2007; Sveum and Sykuta, 2019). The results are substantively the same.

$$Y_{ijm} = f(F_{ijm}, MUF_{ijm}, X_{ijm}, Z_{ijm}, M_{im,}, \varepsilon_{ijm}), \tag{2.4}$$

where $Z$ is the dummy variable for quality segments from 1 to 5.

In addition, the regressions above control for many observed hotel and market characteristics, as well as unobserved hotel characteristics. However, the approach may not control for the endogenous problem of ownership structure. That is, the franchisor might decide whether hotels in a particular location will be franchised or company-owned. The literature on franchising suggests that this decision is made with the agency costs of ownership (Brickley and Dark, 1987; Norton 1988a, 1988b). However, Kosova, et al. (2013) find the effect of franchising on performance disappears with controlling for this endogenous selection. Therefore, this study tests for this endogenous treatment effect for each hotel in the sample by running the second stage OLS regression with a simultaneous endogenous treatment selection model. The selection stage of the model is

$$FRANCHISEE_i = \beta_0 + \beta_1 \%Franchised_i + \beta_2 Quality_i + \epsilon_i, \tag{2.5}$$

where $\%Franchised$ is the proportion of franchised hotels in the same market and $Quality$ means the brand tier of hotels.

This research also runs the selection model for each brand tier. That is, we separately run the regressions for economy, midscale, upper midscale, upscale, and luxury tiers. The selection model can be modified as

$$FRANCHISEE_i = \gamma_0 + \gamma_1 \%Franchised_i + \epsilon_i. \tag{2.6}$$

### Dependent Variable

**Revenues per available room (RevPAR).** The dependent variable is the RevPAR, which is one of the standard industry performance measures in the lodging industry (e.g., Canina, et al., 2005; Carvell, et al., 2016; Chung and Kalnins, 2001; Enz, et al., 2013; Enz, et al., 2014; Kalnins, 2004; Lee and Jang, 2015; Peiro-Signes, et al., 2015; Tsang and Yip, 2009; Vroom and Gimeno, 2007; Yang and Mao, 2017). This measure captures not only room price, but also the level of occupied capacity.[3] Heightened demand should increase the hotel's occupancy or allow hotels to increase their prices or a combination of both. All these possibilities increase revenues. However, rather than just total revenues, RevPAR is revenues divided by the number of rooms offered by the hotels and as such represents a measure of yield since this study is interested in an establishment's performance relative to its size (the number of rooms). Large hotels have higher revenues than smaller hotels. Investigating revenues per available room is appropriate given the focus on demand effects.

### Independent Variables

**Franchise status.** The main independent variable is the franchise status. This study creates a dummy variable $FRANCHISEE$ to identify the franchise status of establishments. The value of $FRANCHISEE$ equals to 1 if the franchisee operates the establishment, while the value of $FRANCHISEE$ equals to 0 if not franchised.[4]

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[3]The average room price (average daily rate or ADR), the occupancy rate, and the average revenue per available room (RevPAR) are the three most commonly used performance indicators in the hotel industry. The relationship between these three measures is revenue per available room = occupancy rate * average room price.

[4]Some hotels are under management contact. Because of the limitation in the data, we cannot identify this category.

Kalnins (2004) shows that the entry of franchised establishments into a market decreases the revenue of the incumbent hotels of the same chain, but the entry of company-owned establishments increases the revenues of the incumbents.

**Multi-unit franchising.** The dummy variable $MUF$ is to represent whether the establishments are operated by multi-unit franchisees. The value of $MUF$ equals to 1 if the establishments are owned by multi-unit franchisees, while the value of $MUF$ equals to 0 if the establishments are operated by single-unit franchisees. Bradach (1997) finds that multi-unit franchisees outperform than do single-unit franchisees in dealing with several management challenges.

**Control Variables**

**Hotel age.** The age of establishments is measured by the difference between the starting year and the year 2013. This study controls hotel age because empirical studies have mixed findings on the performance implications of establishment size that can influence performance in both directions (Yin and Zajac, 2004). Older hotels might have a number of early mover advantages such as network externalities, managerial abilities and preemption of assets, which in turn enhance performance (Lee and Jang, 2017). On the other hand, older properties may not attract sufficient customers becasue of the poor amenities and facilities, for example. This leads to a worse performance outcome.

**Hotel size.** The size of establishments is measured by the number of rooms in the hotel (Canina, et al., 2005; Lee and Jang, 2015; Yin and Zajac, 2004). The number of rooms can serve as a measure of serving capacity or of expected customer volume (Lafontaine and Blair, 2005). Large hotels are typically more luxurious than small

hotels because they have more features and, therefore, will charge higher prices per room. Large hotels might also enjoy the benefits from economies of scale (O'Donnell et al., 2012). This research controls for hotel size because it may be expected to influence performance.

**Payroll.** Payroll is measured as thousands of dollars spent on employees during the entire year of 2012. Using payroll helps control for regional differences or costs of living, which might affect performance (Sveum and Sykuta, 2019).

**Quality segment.** The quality segment might influence the performance of hotels (Pine and Phillips, 2005). High-end hotels with good brand names will have higher revenues per room and, thus, we need to control a hotel's own traits. The quality segments of hotels are divided into six categories from economy to luxury.[5] *Quality* equals to 1 if the quality segment of hotels is economy; *Quality* equals to 2 if the quality segment of hotels is midscale; *Quality* equals to 3 if the quality segment of hotels is upper midscale; *Quality* equals to 4 if the quality segment of hotels is upscale; *Quality* equals to 5 if the quality segment of hotels is upper upscale; and *Quality* equals to 6 if the quality segment of hotels is luxury. However, for confidentiality reasons, this study groups the company's six brands into five brand groups, that is, combining the hotels under luxury and upper upscale tiers in one quality segment.

**The percentage of franchised hotels.** This study calculates the proportion of franchised hotels existing in the same market (defined by zip code).[6] Several studies have used zip codes to define the geographic distance-based scheme (e.g., Chung and

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[5] The rating criterion of quality segments is based on STR chain scales in 2016. Please refer to http://hotelnewsnow.com/Media/Default/Images/chainscales/pdf

[6] Two geographic distance-based schemes have been used in prior studies: zip codes (Chung and Kalnins, 2001; Vroom and Gimeno, 2007) and tracts (Canina, et al., 2005). Vroom and Gimeno (2007) report that the results are not different after testing both geographic distance-based schemes.

Kalnins, 2001; Vroom and Gimeno, 2007). The proportion of franchised hotels in the focal market will influence a business owner's decision to start a franchise because it will be positively correlated with the availability and popularity of the franchising ownership structure, which, in turn, affects the business owner's awareness of this option for the business. As a purpose of controlling the potential endogeneity of ownership structure, this research examines whether the proportion of franchised hotels affects the ownership structure of hotels in a market.

**Competitors.** The variable, Competitors, is measured by the number of other hotels existing in the same zip code area. Baum and Mezias (1992) claim that, in the Manhattan hotel industry, indicating a localized competition effect, a hotel's performance is adversely affected when surrounded by similar hotels. This result is in line with the argument that similar firms are likely to compete for the same resources. The fierce competition might lead to lower performance (Assaf and Cvelbar, 2011). To capture the presence of hotels, this research counts the number of competitors from the focal hotel in a market.

**Income.** Customer demand for travel is partially influenced by overall standards of living. Some markets attract more travelers than others, and then multi-unit owners are more willing to establish a new hotel closer to incumbents in the market with a high demand for travel. Higher income also reflects a potential demand and suggests a higher reliance on local customers.

**Population.** The population (in thousand) information of metropolitan statistical area is from the ACS in 2009. Higher population shows that the hotel is in a busy area which in turn reflects potential demands. A hotel located in a market with

a high demand will generate higher revenues per available room. Thus, this study controls for regional variations.

**State.** State dummy variables are controlled for state-specific unobservable factors. For example, each state can have different regulations with regards to hotels. These state-specific regulations can influence the performance of each hotel. Thus, using 50 state dummy variables for 51 state markets controls for these factors.

### 2.5.2 Results

Table 2.3 contains the results from the OLS model with and without MUF in columns 1 and 2, respectively. Both models have positive and significant coefficients on the franchisee variable, suggesting that franchisee-owned hotels perform better than company-owned hotels, supporting Hypothesis 1. Column 2 shows that the coefficient of MUF is negatively and statistically significant. This means that hotels operated by multi-unit franchisees perform worse than those operated by single-unit franchisees. In line with prior research (Brickley, 1999; Kalnins and Lafontaine, 2004; Thomadsen, 2005) which examines how multi-unit ownership by franchisees can alter the effect of franchising on performance, they suggest that franchisees with a higher count of establishments do not have enough power to monitor their managers' behavior in the establishments. This leads to worse outcomes for multi-unit franchised establishments. On the other hand, franchisees with multiple establishments may be able to manipulate some market power. This may lead to better outcomes for those franchisees. The loss from the monitor cost outweighs the gain from the market power and, in turn, the multi-unit franchisee perform worse than the single-unit franchisee.

Consistent with our priors, the hotels with higher quality tiers having higher

revenue per room, as do the hotels with higher payrolls and more rooms, although the effect of size is economically small. Older properties perform slightly worse, which implies that there is better performance associated with younger, larger, and high-end hotels. Hotels situated in the local market where the local competition gets much severe are also more likely to perform well.

As noted above, there is a reason to be concerned that the ownership structure is endogenous in the sense that the decision to franchising may be correlated with establishment-specific characteristics. When Kosova, et al., (2013) use an instrumental variable to control for franchising choice, the effect of franchising in their study is no longer significant. Columns 3 and 4 of Table 2.3 report the results of the endogenous treatment selection estimation to control for this potential problem. Both models still report a positive and significant effect of franchising on performance, with point estimates very similar to those in the non-treatment estimations. Therefore, Hypothesis 1 is supported. In fact, all point estimates are substantially the same and no less significant than in the first two columns.

The coefficient estimates from the selection equation show that franchisors are more likely to franchise in the market with a high proportion of franchised hotels or with a higher segment hotel cluster. The former result suggests that franchisors allocate establishments to franchisees who have operated existing establishments in a local market. Franchisees must efficiently run their current establishments before being granted the right to expand. A well-performed franchisee would be granted the right to operate multiple establishments in a local market. This implies that franchisees who own several estblishments should at least own a couple of establishments

in given markets. The other possible reason is that franchisors avoid directly operating their owned establishments in a more competitive market. They rather allow franchisees to own a set of geographically clustered establishments because franchisees may possess special expertise in operating establishments in particular types of markets. Franchisees' knowledge of the local market is one reason for franchisors to use franchising, especially considering the knowledge of realized local demand (Norton 1988a, 1988b), or of consumer tastes. The latter result suggests that franchising is a popular business model in the market with a high count of higher segment hotels. When one market includes a high count of high-resource hotels, the market attracts more entrants operated by franchisees. This study concludes that franchisors will choose to allocate establishments of a new franchisee or of an existing franchisee rather than corporate ownership in the market with a count of high resource hotels.

Insert Table 2.3 Here

As discussed above, there appears to be substantial variation in the key variables across hotel quality tiers. To get a better understanding of whether and how franchising may be different across tiers, this study reruns the above models for each individual quality tier. The results are shown in Table 2.4. Overall, the OLS results suggest that franchising is associated with positive performance benefits for midscale and upper midscale hotels, with the largest and most consistent effect among upper midscale, but negative performance effects among economy and luxury hotels. Among upscale hotels, franchising shows no significant effect on performance whatsoever. The results support Hypotheses 2a and 2b. The findings highlight some interesting phenomenons in the U.S. lodging industry. First, consistent with the franchise status

on the table 2.2 in which franchising is the most common ownership structure in midscale and upper midscale segment hotels, franchised establishments perform better in these two segments. The superior performance of franchised establishments in these two segments may help explain why franchising is more popular in midscale and upper midscale segments in the U.S. lodging industry. Second, from the viewpoint of the fit between business model and product market strategy, franchised establishments tend to pursue moderate product market strategies (e.g., midscale and upper midscale) and company-owned establishments are more likely to pursue a extreme product market strategies (e.g., economy, upscale, and luxury). Finally, company-owned establishments perform better in economy and luxury segments (also in the upscale tier though the coefficient is not statistically significant). Company-owned establishments have far superior performance when they are pursuing the extreme strategy. The franchised structure matches better with the moderate product strategy than does the company-owned structure, in terms of better performance.

Similarly, multi-unit franchising is associated with lower performance among economy and midscale hotels, as in the overall model, but have a significant positive effect among upper midscale hotels and no significant effect among upscale or luxury hotels. Competition among the upper midscale and upscale segment hotels is the severest. On the one hand, the middle-resource hotels face the competition from across segment hotels. The middle-resource hotels would face the competition from low-resource hotels, which may make a large investment in upgrading the amenities, such as a swimming pool or a conference room, to compete more directly with middle-resource hotels, and from high-resource hotels, which possess the differentiated service to attract customers

from the middle segment hotels (Baum and Mezias, 1992). On the other hand, the middle-resource hotels also face the competition from the same segment hotels. The middle-resource hotels are more likely to compete aggressively if rivals initiate hostile actions, as these hotels have enough rooms to provide discounts on room rates. This implies that the aggressive action of middle-resource hotels leads to more intense competition. Multi-unit ownership internalizes such inter-segment competition to intra-segment competition. While some degree of intra-segment competition will tend to enhance profits, franchisors may want to cluster franchisees' establishments to avoid franchisees facing too much localized competition, which can be detrimental to chains. Granting many establishments in a market to a single franchisee can give rise to operation efficiency (Bates, 1998; Darr, et al., 1995). High-resource hotels will be unable to take advantage of the multi-unit ownership because their unique combination of services does not induce aggressive competition among across and/or same segment hotels. For low-resource hotels, they charge low rates throughout the year and are, therefore, not motivated to initiate aggressive actions because their low rates do not allow them to provide further discounts on room rates. Consequently, high- and low-resources hotels may not be motivated to act aggressively. They will be unable to take advantage of multi-unit ownership. These results imply that franchising and multi-unit franchising have differential benefits based on the product quality attribute of establishments. The effects of franchising and multi-unit franchising are heterogeneous among hotels. This study suggests that previous research examining franchising may have overlooked these differences.

Controlling for the endogenous franchising decision yields results, shown in Table

2.4, which are statistically and economically similar to the non-treatment results but, for some variables, the size or statistical significance of the coefficients changes, pointing out the importance of controlling for unobserved correlated heterogeneity. Franchising appears to have positive and significant effects among midscale and upper-midscale hotels; negative, though statistically weaker, effects among economy and luxury hotels; and no significant effect for upscale hotels. The results do not reject Hypotheses 2a and 2b. The effect of multi-unit franchising is similar in sign and significance. The importance of local market franchising in the selection treatment equation is also of similar size and statistical significance as in the full sample results.

Insert Table 2.4 Here

## 2.6   Conclusion

This study examines the effect of franchising on hotel performance across all identifiable hotel chain locations in the United States. This research analyzes the effect of franchising in the aggregate, controlling for brand quality, as well as the same model for each individual quality tier. In addition, the effects both with and without controls for the endogeneity of the franchise treatment decision are also tested.

First, contrasting to Kosova, et al. (2013), the full-sample results find that franchised-ownership is associated with higher performance among hotels even if controlling for the endogenous selection. Multi-unit franchising has a negative effect on hotel performance. In line with prior research (Brickley, 1999; Kalnins and Lafontaine, 2004; Thomadsen, 2005) which examines how multi-unit ownership by franchisees can alter the effect of franchising on performance, they suggest that franchisees with a

higher count of franchised establishments do not have enough power to monitor their managers' behavior in their establishments than franchisors. This leads to worse outcomes for multi-unit franchised establishments. On the other hand, franchisees operating multiple establishments may be able to manipulate some market power. This may lead to better outcomes for those franchisees. The loss from the monitor cost exceeds the gain from the market power and, in turn, the multi-unit franchisees perform worse than single-unit franchisees.

Second, this study shows that the effect of franchising on hotel performance varies across hotel segments in ways that the full-sample analysis fails to capture. The effect of franchising on hotel performance is positive only for those hotels in the midscale and upper midscale quality tiers, while it is negative for those hotels in the economy and luxury tiers. Moreover, the effects of multi-unit franchising are negative for economy and midscale hotels, but positive for upper midscale hotels and insignificant for upscale and luxury hotels. This points to heterogeneity across hotel quality tiers that is often not considered in the existing empirical literature. The results suggest greater care need be given to the study of the lodging industry to control for these differences.

In terms of contributions to the literature on franchising, the introduction of the endogenous selection of franchising, along with the focus on establishment-level performance across hotel segments, represents what we believe to be a unique contribution to the literature. The contribution to the franchising literature is to highlight the value of the establishment level research across hotel segments. The franchising effect on performance has mixed findings in prior studies. This study not only high-

lights the value of rebalancing research attention from pooling quality tiers to across quality tiers but also raises the question of whether there is an alignment between the performance across these two levels of analysis.

Another contribution is the contingent role of firms' business models in the determination of their market value. Firms' business models are the nature source of competitive advantages, which can also emerge from superior product positioning. Not just the product positioning is a strategy of firms, but the business model is also of strategic importance to firms. The empirical results show that both can enhance firms' performance. The study points out the need to investigate competition among various ownership structures as well as product positioning. Business model and product positioning may have implications both for the value creation and for value capture. One needs to know more about the strategic effect of business models and how they affect the product positioning of firms in a competitive environment. The study inspires new research on the relationship between ownership structure and product positioning, which, in turn, affects firm performance.

In fact, the research will be seen as having made a related empirical contribution to the strategy literature by obtaining and analyzing a nationwide data with establishment-level data on over 6000 units in one single industry. While strategy and organizational researchers have tended to focus on firm-level data, this study can provide new insights into the strategies, structures, and behaviors of large corporations, while more detailed establishment-level data may be difficult to access.

The findings have inferred that the effect of franchising does not always improve the performance of hotels. Franchised hotels have higher performance outcomes in

midscale and upper midscale tiers, while company-owned hotels have higher performance outcomes in economy and luxury tiers. The results are important for the managers of hotel chains to think about franchising or not. In the environment where competition among hotels is tough or the market structure is more fluctuating, franchising is a good solution to deal with agency problems because of the natural advantages from flexibility and local adaption. In the environment where competition among hotels is soft or the market structure is more stable, company-owned ownership is related to a higher performance outcome because of their advantages emphasizing predictability and control. The findings provide insights to acknowledge that the relative importance of franchising versus company-owned ownership.
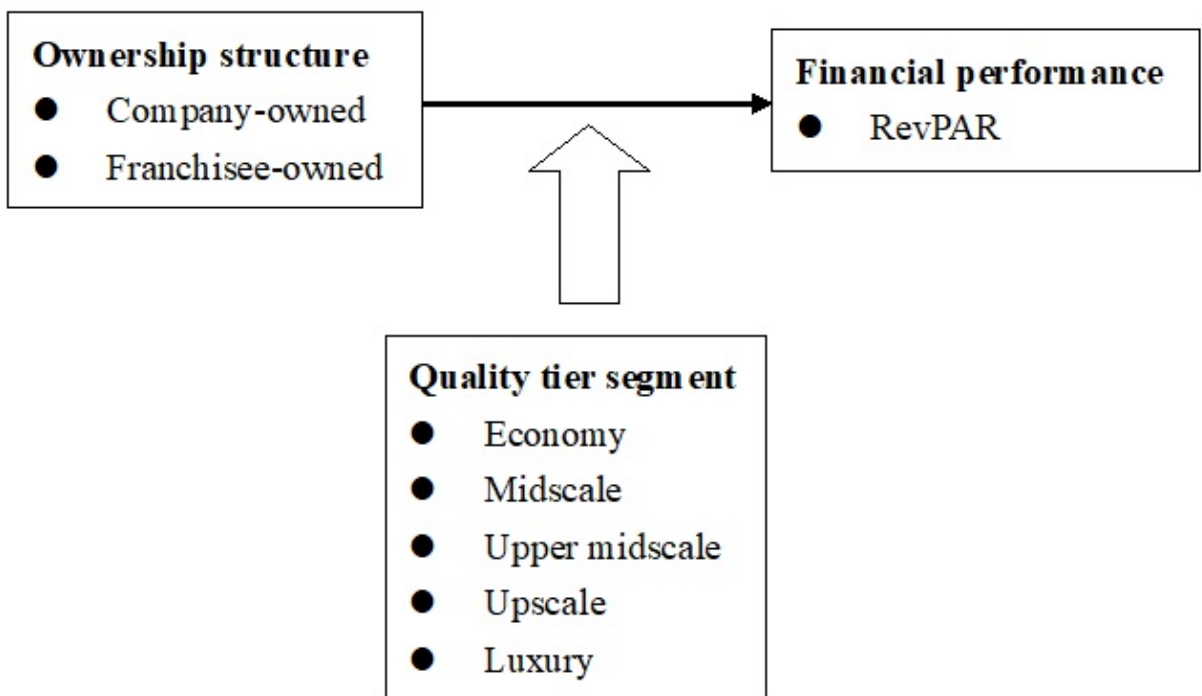
Figure 2.1: Conceptual framework

Table 2.3: Full sample franchise effect

|  | OLS | | 2SLS | |
|---|---|---|---|---|
| Franchisee | 0.04*** | 0.08*** |  |  |
|  | [0.01] | [0.01] |  |  |
| Franchisee-ET |  |  | 0.06*** | 0.09*** |
|  |  |  | [0.01] | [0.02] |
| Quality segment | 0.09*** | 0.09*** | 0.09*** | 0.09*** |
|  | [0.01] | [0.01] | [0.01] | [0.01] |
| Hotel size | 0.00*** | 0.00*** | 0.00*** | 0.00*** |
|  | [0.00] | [0.00] | [0.00] | [0.00] |
| Hotel age | -0.01*** | -0.01*** | -0.01*** | -0.01*** |
|  | [0.00] | [0.00] | [0.00] | [0.00] |
| LnPayroll | 0.48*** | 0.48*** | 0.48*** | 0.48*** |
|  | [0.02] | [0.02] | [0.02] | [0.02] |
| Competitors | 0.00 | 0.00** | 0.00* | 0.00*** |
|  | [0.00] | [0.00] | [0.00] | [0.00] |
| LnIncome | 0.09*** | 0.09*** | 0.09*** | 0.09*** |
|  | [0.01] | [0.01] | [0.01] | [0.01] |
| LnPopulation | -0.02*** | -0.02*** | -0.02*** | -0.02*** |
|  | [0.01] | [0.01] | [0.01] | [0.01] |
| Multi-unit franchising |  | -0.09*** |  | -0.09*** |
|  |  | [0.01] |  | [0.01] |
| Constant | -0.83*** | -0.91*** | -0.85*** | -0.91*** |
|  | [0.17] | [0.17] | [0.17] | [0.17] |
| N | 6000 | 6000 | 6000 | 6000 |
| State FE | Y | Y | Y | Y |
| First Stage | | | | |
| Franchised Hotels |  |  | 4.69*** | 4.71*** |
|  |  |  | [0.10] | [0.10] |
| Quality segment |  |  | 0.06*** | 0.06*** |
|  |  |  | [0.02] | [0.02] |
| Constant |  |  | -1.87*** | -1.87*** |
|  |  |  | [0.07] | [0.07] |
| $R^2$ | 0.69 | 0.69 |  |  |

Table 2.4: Franchise effect for each quality segment

| | economy OLS | economy 2SLS | midscale OLS | midscale 2SLS | upper midscale OLS | upper midscale 2SLS |
|---|---|---|---|---|---|---|
| Franchisee | -0.06** | -0.01 | 0.04 | 0.08*** | 0.06*** | 0.04* |
| | [0.03] | [0.03] | [0.03] | [0.03] | [0.03] | [0.03] |
| Franchisee-ET | -0.05* | -0.02 | 0.09*** | 0.11*** | 0.08*** | 0.06* |
| | [0.03] | [0.03] | [0.03] | [0.03] | [0.03] | [0.03] |
| Hotel size | -0.01*** | -0.01*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** |
| | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| Hotal age | -0.01*** | 0.00*** | -0.01*** | -0.01*** | -0.01*** | -0.01*** |
| | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| LnPayroll | 0.61*** | 0.64*** | 0.53*** | 0.52*** | 0.57*** | 0.56*** |
| | [0.04] | [0.04] | [0.05] | [0.04] | [0.03] | [0.03] |
| Competitors | 0.00 | 0.00 | 0.00 | 0.00 | 0.01*** | 0.01*** |
| | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| LnIncome | 0.11*** | 0.11*** | 0.10*** | 0.09*** | 0.05** | 0.05** |
| | [0.03] | [0.03] | [0.03] | [0.03] | [0.03] | [0.03] |
| LnPopulation | -0.05*** | -0.04*** | -0.04* | -0.04* | -0.05*** | -0.05*** |
| | [0.02] | [0.02] | [0.02] | [0.02] | [0.01] | [0.01] |
| Multi-unit franchising | -0.23*** | -0.24*** | -0.13*** | -0.11*** | 0.04*** | 0.05*** |
| | [0.03] | [0.03] | [0.03] | [0.03] | [0.02] | [0.02] |
| Constant | -0.98*** | -1.01*** | -0.78** | -0.80** | -0.35 | -0.41 |
| | [0.33] | [0.32] | [0.38] | [0.37] | [0.32] | [0.31] |
| N | 1700 | 1700 | 1300 | 1300 | 1600 | 1600 |
| State FE | Y | Y | Y | Y | Y | Y |
| | 0.59 | 0.61 | 0.53 | 0.54 | 0.51 | 0.51 |
| **First Stage** | | | | | | |
| Franchised Hotels | 4.66*** | 4.67*** | 4.51*** | 4.54*** | 5.26*** | 5.26*** |
| | [0.16] | [0.16] | [0.20] | [0.20] | [2.99] | [3.00] |
| Constant | -2.03*** | -2.03*** | -1.61*** | -1.62*** | -1.34*** | -1.34*** |
| | [0.08] | [0.08] | [0.07] | [0.07] | [0.09] | [0.09] |
| R² | 0.61 | 0.53 | 0.54 | | 0.51 | 0.51 |

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Table 2.5: Franchise effect for each quality segment (continued)

| | upscale | | | | luxury | | | |
|---|---|---|---|---|---|---|---|---|
| | OLS | | 2SLS | | OLS | | 2SLS | |
| Franchisee | -0.02 | -0.07 | | | -0.09** | -0.02 | | |
| | [0.03] | [0.03] | | | [0.04] | [0.07] | | |
| Franchisee-ET | | | -0.04 | -0.08 | | | -0.08* | -0.02 |
| | | | [0.04] | [0.06] | | | [0.05] | [0.07] |
| Hotel size | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** | 0.00*** |
| | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| Hotal age | 0.00 | 0.00 | 0.00 | 0.00 | 0.00*** | 0.00*** | 0.00*** | 0.00*** |
| | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| LnPayroll | 0.50*** | 0.50*** | 0.50*** | 0.50*** | 0.53*** | 0.54*** | 0.53*** | 0.54*** |
| | [0.06] | [0.06] | [0.06] | [0.06] | [0.03] | [0.03] | [0.03] | [0.03] |
| Competitors | 0.01*** | 0.01*** | 0.01*** | 0.01*** | 0.00 | 0.00 | 0.00 | 0.00 |
| | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] | [0.00] |
| LnIncome | 0.11*** | 0.11*** | 0.11*** | 0.11*** | 0.10*** | 0.10*** | 0.10*** | 0.10*** |
| | [0.03] | [0.03] | [0.03] | [0.03] | [0.04] | [0.04] | [0.03] | [0.03] |
| LnPopulation | -0.04** | -0.04** | -0.04** | -0.04** | -0.03 | -0.04* | -0.03 | -0.04* |
| | [0.02] | [0.02] | [0.02] | [0.02] | [0.02] | [0.02] | [0.02] | [0.02] |
| Multi-unit franchising | | 0.05 | | 0.05 | | -0.08 | | -0.08 |
| | | [0.06] | | [0.06] | | [0.07] | | [0.07] |
| Constant | -0.67 | -0.65 | -0.66 | -0.65 | -0.84** | -0.89** | -0.85** | -0.89** |
| | [0.50] | [0.50] | [0.49] | [0.49] | [0.41] | [0.41] | [0.39] | [0.39] |
| N | 900 | 900 | 900 | 900 | 500 | 500 | 500 | 500 |
| State FE | Y | Y | Y | Y | Y | Y | Y | Y |
| First Stage | | | | | | | | |
| Franchised Hotels | | | 4.72*** | 4.72*** | | | 4.23*** | 4.23*** |
| | | | [0.27] | [0.27] | | | [0.32] | [0.32] |
| Constant | | | -1.98*** | -1.98*** | | | -1.54*** | -1.54*** |
| | | | [0.10] | [0.10] | | | [0.11] | [0.11] |
| $R^2$ | 0.50 | 0.51 | | | 0.74 | 0.74 | | |

# Chapter 3

# Maximum or minimum? Strategic patterns of the lodging industry

## 3.1　Introduction

This chapter examines the joint choices of geographic location and product positioning (or brand) by multi-unit operators in the US lodging industry.[1],[2] Multi-unit owners in the lodging industry can operate two distinct product market strategies: horizontal or vertical differentiation. On the one hand, horizontal differentiation is adopted by multi-unit owners if the product variant is defined as the brand. Multi-unit owners might simultaneously operate several same-tier/cross-chain hotels, for example, Holiday Inn, Comfort Inn, and Hampton Inn. These hotel brands rate as the upper midscale tier but they belong to different hotel chains. On the other hand, multi-unit owners might operate multiple cross-tier/same-chain hotels. This is called vertical differentiation because the product variant is defined as the quality. One of the examples in vertical differentiation is that multi-unit owners operate Hilton, Hilton Garden Inn, and Hampton Inn. These hotel brands rate from the upper upscale tier to the upper midscale tier and they belong to Hilton Worldwide.[3]

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[1]Table 1 is the main U.S. hotel companies and their chain brands.
[2]Table 2 shows the hotel companies statistics and their brand portfolio in the sample.
[3]Table 3 provides a piece of evidence on multi-unit owners' product portfolio.

What does the market look like in the presence of horizontal or vertical differentiation? Will multi-unit owners cluster or separate their establishments? Will multi-unit owners undertake the similar product positioning in different markets? Or will they cater to a particular subset of consumers? Multi-unit owner' choices on location and brand are considered as the two-dimension horizontal model, while their choices on location and quality are considered as the two-dimension horizontal and vertical model. The literature on two-dimension Hotelling models concludes that firms choose to maximally differentiate on one characteristic and minimally differentiate on the other characteristic (Ansari, et al., 1998; Irmen and Thisse, 1998; Neven and Thisse, 1990). Equilibrium profits will be higher under this configuration because differentiation on one characteristic weakens price competition on the other characteristic. Therefore, firms could choose similar, broadly appealing to consumers' tastes on the second characteristic and, because differentiation on the other characteristic softens competition, they are able to obtain higher profits.

Irmen and Thisse (1998) further imply that firms choose to maximally differentiate on the dominant characteristic, the one that matters most to consumers. We argue that, assuming the geographic location is the dominant characteristic and the brand is the dominated characteristic, the model implies that multi-unit owners will structure their portfolios of establishments to be geographically differentiated while choosing less differentiated brands. Alternatively, we argue that, if the geographic location is the dominated characteristic and the brand is the dominant characteristic, the model implies that multi-unit owners will locate their establishments near one another in a geographic space while choosing highly differentiated brands. If multi-unit owners

build a new establishment in the geographic market where competitors and their incumbent establishments are present, they faces the choice about the geographic distance of the new establishment relative to competitors and incumbents. This raises an interesting question: Does the new establishment locate close to competitors or incumbents of the same owner?

The empirical studies on two-dimension Hotelling models are few. Netz and Taylor (2002) and Iyer and Seetharaman (2008) examine the relationship between geographic location and product differentiation in the retail gasoline industry. Netz and Taylor (2002) find that retailers become more differentiated on service offerings as geographic differentiation increases. They obtain a max-max equilibrium in which firms maximally differentiate themselves on both characteristics. Iyer and Seetharaman (2008) find that, however, retailers are more likely to differentiate service levels as the distance decreases between establishments. Iyer and Seetharaman's (2008) findings are consistent with the existing literature on two-dimension Hotelling models where firms maximally differentiate themselves on one dimension and minimally differentiate on the other dimension. Watson (2009) finds that, in a retail eyeglass industry, retailers sell a variant style of eyeglass and their establishments are adjacent to each other. As we know, there is no literature focuses on the lodging industry.

This chapter offers a test of the prediction using unique and detailed data in the Texas lodging industry at a multi-unit owner level to examine the effect of product positioning on hotels' location choice. We observe the full population of hotels in Texas, which allows a direct comparison between horizontal differentiation and vertical differentiation on the location pattern rather than relying on observations of

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one family of hotel chains. Moreover, the data include establishments' characteristics such as the number of rooms, sales, operating name or brand, location information (address, city and zip code, as well as the geographic coordinate), and ownership characteristics. This study controls for differences in the quality, or amenity level, of hotel brands using hotel brand service levels (e.g., "economy", "midscale", "upper midscale", "upscale", "upper upscale", and "luxury") defined by STR Global, a lodging industry research organization, by matching business name responses with the STR Global classification list.

The Texas lodging industry is an ideal setting to examine the questions presented above for several reasons. First, hotels compete in a large number of geographically distinct markets. Second, hotels offer close to one single product, a stay in a room. Unlike other industries in which product differentiation is difficult to measure, this research can accurately capture heterogeneity in product/service quality among hotels based on their segments. Third, the ownership structure of multi-unit owners is common in the Texas lodging industry. Of the hotels in our sample, 26.07% of them are operated by multi-unit owners. Fourth, unlike retailers or firms in other service industries, hotel chain companies usually operate multiple hotels or have multiple hotel brands across geographic markets. Multiple hotel brands target different product segments and each brand also has multiple establishments across geographic markets. Finally, the Texas lodging industry is a significant sector of the economy. According to the report from the American Hotel & Lodging Association in 2018, the total number of hotels in Texas is up to 5,144 establishments and the number of rooms is around 457,762 rooms. The Texas lodging industry creates 632,735 job

positions and contributes $51 billion to the communities.

Hotels dedicate to mitigate competition and create niches of the market power by offering unique price/quality combinations to a particular segment of customers (Mazzeo, 2002). Studies have pointed out customers are more likely to choose one particular segment of hotels than to one specific brand (Skogland and Siguaw, 2004). Hotels rarely change segments as chain companies endeavor to create and maintain their reputations by offering consistent amenities and services (Rushmore and Baum, 2001). Hence, the empirical setting allows us to examine the relationship between product heterogeneity and geographic location pattern more clearly.

If the distance is the dominant characteristic and the brand is the dominated characteristic, the two-dimension Hotelling model predicts that multi-unit owners structure their portfolio to be geographically differentiated while choosing less differentiated brands, which results in a max-min equilibrium. If the distance is the dominated characteristic and the brand is the dominant characteristic, the two-dimension Hotelling model predicts that multi-unit owners become more differentiated on the portfolio of brands as geographic differentiation decreases, which leads to a min-max equilibrium.

The results may be consistent with the two-dimension Hotelling model under certain assumptions. In a case of the dominance of distance, multi-unit owners choose to operate their multiple hotels in the economy tier. Price competition among economy hotels is strong because of their similar, limited service. Geographic distance as one dimension to reduce price competition is more effective. In a case of the dominance of brand, on the other hand, multi-unit owners prefer to operate their multiple hotels in

higher quality tiers, for example, upper upscale or luxury. As these high-end hotels possess higher resources and so face less price competition with their competitors, they are likely to be closer to each other. This is because they could be beneficial to their hotel members within the same multi-unit owner and these neighbors tend to improve the operating performance from the high-end hotels.

This chapter is organized as follows. The next section introduces a literature review on location theory, which focuses mainly on the two dimension Hotelling model. The theoretical background and hypotheses are developed in section 3. The data are introduced in section 4 and section 5 outlines an empirical model and results. Section 6 concludes.

## 3.2 Literature Review

### 3.2.1 Literature on location theory

Hotelling (1929) integrates spatial (product) differentiation into market models and suggests that firms have incentives to minimally differentiate on location, given the assumptions of homogeneous goods, uniformly distributed consumers and linear transportation costs. Subsequent works have demonstrated that almost any equilibrium configuration can be obtained based on the assumptions of the model such as the distribution of consumer locations, the elasticity of demand, the form of the transport cost, and consumer heterogeneity. Eaton and Lipsey (1975) show that, if the distribution of consumers is nonuniform, the location of firms will be more concentrated. Relaxing the assumption of inelastic demand, Smithies (1941) mitigates the incentive for firms to minimally differentiate on location, because, if they move too far from the endpoints of the market, firms will lose consumers. d'Aspremont, et al. (1979)

claim that, under the assumption of quadratic transportation cost, the best strategy of two firms is to locate as far away as possible from each other. They obtain an equilibrium of maximal differentiation. de Palma, et al. (1985) introduce consumer heterogeneity and claim that minimal differentiation is attained if the magnitude of demand is large enough.[1]

When it comes to the location decision, firms face two opposite incentives, which generate mixed results. Firms have incentives to choose their product positioning close to competitors' one to capture more consumers. This is called the market share effect (Pinske and Slade, 1998). Working against this incentive, however, is the fact that reducing spatial or product differentiation leads to greater competition in the price dimension; thus, a firm has an incentive to locate farther from its rivals to reduce price competition. This scenario is called the market power effect. Irmen and Thisse (1998) characterize the theoretical literature as being more supportive of dispersion than cluster, which means the market power effect dominates the market share effect.

Hotelling (1929) assumes that each firm has a single plant or product. However, there is no reason why a firm should not open several plants or sell several products to exercise more consumer surplus. Lancaster (1990) mentions that there are three main potential influences on the firms' choice of the product variety: (1) the existence of inter-product economics on the production side; (2) the potential for increasing demand by offering more varieties; (3) use of product variety for strategic purposes. Now, the firm needs to consider not only the location but also the number of plants or products. The bundling of products brings greater sales and profits because it

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[1]See Ben-Akiva, et al. (1989), Gabszewicz and Thisse (1979), Wauthy (1996) and others for one dimensional models.

allows firms to capture new consumers. In addition, due to be increasingly difficult to maintain or increase profitability levels, the firm has an incentive to stabilize its market position and relative price separation. When a firm can significantly offer more services than any of its competitors, it can maintain this position. Firms must decide on price as well as the positioning of their offerings on more than one dimension. As a result, Hotelling's conclusion needs to be modified when considering the introduction of more than one dimension.

When firms have discretion over the levels of more than one dimension, several types of configurations are possible, ranging from firms choosing the same level on all dimensions (no differentiation, i.e., min-min), to firms choosing as much separation as possible on all dimensions (maximal differentiation, i.e., max-max), and to firms choosing an "in-between" degree of differentiation (e.g., maximal differentiation on one dimension and minimal differentiation on the other, i.e., max-min; or maximal differentiation on one dimension and partial differentiation on the other, i.e., partial-max).

Differentiated products can be a set of products located at various places, which can be a combination of various levels of characteristics. The degree of product differentiation can be expressed in two separate ways (Lancaster, 1990). (1) Differentiation is called horizontal when the level of some characteristics between two products is lower for some others, as in the case of different versions, called varieties. Consumers will take a less preferred variety if their most preferred variety is not in the market. Instead, they will buy the closest product in terms of a certain distance function. (2) Differentiation is called vertical when the level of all characteristics between two

products is lower as in the case of different series, called qualities. Consumers desire high-quality products more than low-quality products if the price of products is the same.

Many studies have examined the horizontal case. Ben-Aliva, et al. (1989) and de Palma, et al. (1985) add a second dimension of horizontal differentiation. In their model, products are offered at distinct locations and differ in the brand specification. Firms choose their location but not the brand they sell. Product differentiation is endogenous in the location dimension but exogenous in the brand dimension. They show that the collocation of firms is more likely when the smaller in the transport cost, the market size, the number of firms and the larger in the heterogeneous tastes. The similar findings are provided by Ansari, et al. (1998), Irmen and Thisse (1998) and Tabuchi (1994). Their explanation is if firms can differentiate on brands, they have incentives to choose to collocate because price competition is softened due to product differentiation. Irmen and Thisse (1998) mention that differentiation in one dimension is enough. Thus, when each characteristic can be weighted differently from the others, for example, when there exists a dominant characteristic, maximum differentiation occurs along with the dominant characteristic. According to Irmen and Thisse (1998), differentiation in one dimension is enough to reduce price competition among firms and to allow firms to benefit the advantage that locates in the central point in all other dimensions.

Other research have studied the two-dimension vertical differentiation model. Hauser (1988) and Vandenbosch and Weinberg (1995) study a model with two vertical characteristics (quality) and find max-min product differentiation equilibria. If two

quality dimensions are used to define a product specification, only one of them will be used to differentiate, and the other will be equal across firms. That is, in equilibrium, two firms tend to choose positions that will represent maximal differentiation on one dimension and minimal differentiation on the other dimension. Both firms want to have the highest quality, but because of the strategic force, only one firm will be allowed there. The firm, which is unable to choose the highest quality position, differentiates its product by choosing the minimum quality on one dimension because of the demand force. This choice reduces price competition while, at the same time, maintains a sufficient high-quality level for the differentiating firm's product to appeal to consumers.

The stream of research has assumed constant marginal costs of production. It ignores the possibility that selecting a product position not only has demands and competitive implications but also affects costs. In many product categories, it is typically the case that the higher-quality provision comes with higher production costs. Lauga and Ofek (2011) consider the effect of quality costs on firms' differentiation strategies. When the cost to providing quality is too high, firms use only one attribute to differentiate their products. In other words, maximal differentiation on one dimension and minimal differentiation on the other in which a max-min equilibrium attains. In addition, they always differentiate along the dimension with the greater attribute range. As for the dimension with the smaller range and along which they collocate, firms either choose the highest quality level or the lowest quality level possible, depending on whether the marginal costs of quality provision are low or intermediate, respectively. However, for larger quality provision costs, firms differentiate their prod-

ucts on both dimensions. They find a maximal differentiation equilibrium where one firm chooses the highest quality level on both attributes while its rivals offers the lowest quality level on both attributes where a max-max equilibrium is attained.

There is less research on the two-dimension horizontal and vertical models. The previous literature, for example, Dos Santos Ferreira and Thisse (1996) and Neven and Thisse (1990), investigates a two-dimension model where is horizontal differentiation (variety) and vertical differentiation (quality). They prove that there exists a max-min equilibrium in which firms never choose to fully differentiate on both dimensions.

The literature above concludes that either vertical or horizontal differentiation can be used to mitigate price competition and facilitate cluster among firms. The generalization of the research is that price competition will be relaxed when there is sufficient differentiation on location, quality, or variety. If sufficient product differentiation holds in the dominant non-locational attribute, firms can collocate in the center because there is no necessary to differentiate in the geographic space. When other attributes are insufficiently differentiated, however, firms need to locate far from their rivals so as to reduce the intensity of price competition.

However, few empirical studies have focused on the relationship between multi-dimensional product differentiation and location choice, and how the product and location decision of firms are joined affected by some fundamental characteristics of local markets. For example, Elizalde (2013) and Thomadsen (2007) show that firms' incentives to differentiate depend on market size. In large markets, firms increase their profits by moving towards the edges of the market, whereas in small markets, they increase profits by moving towards the market center. That is, large town size

favors maximum location differentiation while small-town size favors minimum location differentiation. Iyer and Seetharaman (2008) find that those closely located retailers who face sufficient income dispersion across consumers in a local market may differentiate on product design and pricing strategies. Watson (2009) finds that if the incumbent faces relatively little local competition, with few or no proximate competitors, shifting a rival to join the incumbent from elsewhere in the market is more likely to lead to an expansion in the incumbent's product range. Netz and Taylor (2002) find that gasoline stations tend to locate further from competitions when the number of stations, the fraction of the market served by non-branded stations, and the fraction of the market that is the same brand as the center, increases in a given market. The result in Netz and Taylor (2002), however, is not consistent with the findings from the multidimensional differentiation model. They find that gasoline stations increase spatial differentiation as differentiation in other attributes increases. The research above have conducted many industries, however, to the best of our knowledge, this is the first work that shows the relationship between geographic location and product differentiation in the lodging industry.

## 3.3   Theoretical Background and Hypotheses

### 3.3.1   Two-dimension Hotelling model: geographical location and horizontal differentiation

Some theoretical studies have extended the Hotelling model via considering the second dimension of horizontal differentiation. Ben-Aliva, et al. (1989) find that firms locate together at the market center when brand differentiation is large enough. Tabuchi (1994) and Veendorp and Majeed (1995) support that a firm maximizes differentiation

on one dimension while minimizes differentiation on the other dimension. Elizalde (2013) analyzes that cinemas are differentiated along two dimensions that are geographical location and the set of movies exhibited. The min-max equilibrium is obtained where cinemas locate close to each other and show different movies; the other equilibrium is max-min where cinemas locate at opposite ends of towns and show a very similar set of movies.

In a lodging industry, a hotel's location and brand are considered the two horizontal characteristics of its product. A horizontal differentiation in brands means that multi-unit owners operate same-tier/cross-chain hotels in a territorial market. The dimension that firms choose maximal differentiation on the dominant characteristic, the one that matters most to consumers (Neven and Thisse, 1990). Assuming the geographic location is the dominant characteristic and the brand is the dominated characteristic, this model then implies that firms will locate far away to one another in the geographic space while choosing less differentiation in brands. For tourists who have limited budgets have an incentive to choose the low-end hotels such as midscale. They are indifferent to hotel chains but care about how much they need to pay. If one of the hotels is not available, they will choose another same hotel segment even if this hotel is operated by different hotel chains. But the distance to hotels is the dominant characteristic for these tourists because they have no incentives to choose a hotel located in an area where is far away. Instead, they will choose the nearest hotel which satisfies with their desires. They do not drive a long distance to hotels because the hotel brand does not matter for them. Therefore, we hypothesize multi-unit owners will maximally differentiate on the geographic location while minimally

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differentiate on the brand.

**Hypothesis 1.** *Multi-unit owners have incentives to maximize the geographic location while to minimize the horizontal product differentiation.*

### 3.3.2 Two-dimension Hotelling model: geographical location and vertical differentiation

The literature on location theory less addresses the two-dimension Hotelling model via geographical location and vertical differentiation. In the theoretical part, Economides (1989) introduces an additional choice variable, quality, into the Hotelling framework. He finds that the max-min principle is obtained in which firms choose to maximally differentiate on the dimension of location and minimally differentiate along with the quality attributes. Dos Santos Ferreira and Thisse (1996) claim that firms have an incentive to choose the highest rate, thus resulting in minimum differentiation along with the transportation characteristic if there is maximum differentiation along with the geographical characteristic. In empirical studies, Iyer and Seetharaman (2008) and Netz and Taylor (2002) study geographical and service level differentiation in retail gasoline stations. Netz and Taylor (2002) find that retailers become more differentiated in the service offerings as geographic differentiation increases. However, Iyer and Seetharaman (2008) find that retailers are more likely to provide differentiated service quality levels when geographic differentiation is limited. Watson (2009) suggests that eyeglass retailers maximally differentiate in product style and minimally differentiate in geographic location. The literature above concludes that a max-min equilibrium exists, except Netz and Taylor (2002) implying a max-max equilibrium.

The vertical differentiation in the lodging industry means that multi-unit owners

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operate cross-tier/same-chain hotels in a territorial market. Assuming the quality is the dominant characteristic and the geographical location is the dominated characteristic, this model implies that in equilibrium firms will maximally differentiate on the dimension of quality and locate close to each other. Quality does matter for those tourists who have brand loyalties because different quality tier hotels are not substitute. For example, tourists and business travelers who prefer to luxury hotels would like to choose upper upscale hotels rather than economy hotels when there is no room available in the luxury hotel. In this scenario, hotels operated by a multi-unit owner will collocate together because it helps hoteliers to capture consumers. Thus, we hypothesize that multi-unit owners will minimally differentiate on the geographic location while maximally differentiate on the quality.

**Hypothesis 2.** *Multi-unit owners have incentives to minimize the geographic location while to maximize the vertical product differentiation.*

## 3.4 The Data

To test the hypotheses proposed in the previous section, this research utilizes the hotel properties in Texas with data on hotel characteristics and geospatial information. The main data, *Hotel Occupancy Tax Receipts,*[4] are from the Texas Comptroller of Public Accounts at the establishment level in 2010-2017.[5] For each hotel, this study observes affiliation, location, capacity, name, and a measure of age. Table 3.1 summarizes hotel companies and their chain brands in the samples. STR Global, a

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[4]Other studies using this data set include Chung and Kalnins (2001), Conlin and Kadiyali (2006), Hollenbeck (2016), Kalnins (2004), Kalnins and Chung (2004, 2006), McCann and Vroom (2010), Suzuki (2013), and Yang and Mao (2017).

[5]We aggregate the data from the establishment level to the multi-unit owner level. Table 4 shows the number of multi-unit owners each year in the sample.

## Table 3.1: Hotel companies statistics

| Hotel company | Quality tier | | | | | | Number of outlets |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | 1 | 2 | 3 | 4 | 5 | 6 | |
| Intercontinental Hotels Group | 0 | 67 | 24 | 50 | 0 | 9 | 150 |
| Carlson Hospitality Company | 0 | 0 | 19 | 4 | 0 | 0 | 23 |
| Choice Hotels International | 10 | 16 | 63 | 5 | 0 | 0 | 94 |
| Hilton Worldwide | 0 | 0 | 55 | 79 | 32 | 0 | 166 |
| World of Hyatt | 0 | 0 | 0 | 32 | 16 | 0 | 48 |
| Marriott International | 0 | 0 | 73 | 242 | 30 | 0 | 345 |
| Wyndham Worldwide | 36 | 39 | 3 | 0 | 12 | 0 | 90 |
| LQ Management LLC | 0 | 446 | 0 | 0 | 0 | 0 | 446 |
| G6 Hospitality | 68 | 0 | 0 | 0 | 0 | 0 | 68 |
| Citigroup Global | 41 | 0 | 0 | 0 | 0 | 0 | 41 |
| Best Western Company | 0 | 32 | 0 | 0 | 0 | 0 | 32 |
| Red Lion Hotels Corporation | 21 | 0 | 0 | 0 | 0 | 0 | 21 |
| Number of outlets | 431 | 600 | 242 | 417 | 129 | 9 | 1255 |
| Independents | | | | | | | 538 |

lodging industry research organization, provides a standardized measure of quality, giving a rating of economy through luxury for each hotel listed. We match business name responses with the STR Global classification list. Table 3.1 highlights the 13 main hotel companies and the number of establishments operated by them in each quality tier. The analysis focuses on 25 Metropolitan Statistical Areas (MSA) in Texas.[6] These 25 MSAs contain 48.32% of Texas hotels.

Table 3.2 presents the descriptive statistics of the regressors in the sample in Texas. The average nearest distance to the owner's other hotels is 65.63 miles. The average differentiation is 0.38. The average experience of a multi-unit owner is 10.85 years. This table also observes the percent of chained hotels and the percentage of

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[6]The definition of Metropolitan Statistical Area is from the Population Division, U.S. Census Bureau in 2017. The 25 MSAs in Texas are Abilene, Amarillo, Austin-Round Rock,Beaumont-Port Arthur, Brownsville-Harlingen, College Station-Bryan, Corpus Christi, Dallas-Fort Worth-Arlington, El Paso, Houston-The Woodlands-Sugar Land, Killeen-Temple, Laredo, Longview, Lubbock, McAllen-Edinburg-Mission, Midland, Odessa, San Angelo, San Antonio-New Braunfels, Sherman-Denison, Texarkana, Tyler, Victoria, Waco, and Wichita Falls.

**Table 3.2: Descriptive statistics in the multiunit level**

| N = 501 | Mean | S.D. | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|---|---|
| (1) The avg. nearest distance to the owner's other hotels (miles) | 65.63 | 99.85 | 1.00 | | | | | | |
| (2) Product differentiation | .38 | .58 | 0.03 | 1.00 | | | | | |
| (3) Experience | 10.85 | 6.46 | -0.08 | 0.03 | 1.00 | | | | |
| (4) The percentage of chained hotels | .06 | .18 | -0.03 | -0.07 | -0.07 | 1.00 | | | |
| (5) The percentage of franchised hotels | .04 | .09 | -0.00 | -0.03 | -0.09 | 0.38 | 1.00 | | |
| (6) The distance to the owner's headquarters (miles) | 1463.19 | 2340.43 | 0.02 | 0.03 | -0.18 | 0.64 | 0.29 | 1.00 | |
| (7) The avg. distance to the owner's other hotels (miles) | 109.31 | 127.94 | 0.83 | 0.04 | -0.14 | 0.21 | 0.20 | 0.31 | 1.00 |

franchised hotels are 0.06 and 0.04 separately. In addition, the distance to the owner's headquarters and average distance to the owner's other hotels are 1,463.19 miles and 109.31 miles separately. Finally, the sample contains 501 observations.

## 3.5 Empirical Method and Results

### 3.5.1 Model Specification

To identify whether a tendency towards minimal or maximal differentiations dominates, this study particularly focuses on how the degree of product differentiation affects the location decision of firms. Following Netz and Taylor (2002), the empirical model can be written as

$$DIFF_{i,t} = \alpha + \beta ATTRI_{i,t} + \gamma X_{i,t} + \delta \tau_t + \epsilon_{i,t}, \tag{3.1}$$

where $i$ indexes the multi-unit owner, and $t$ indexes the year from 2010 to 2017. $DIFF$ measures the degree of spatial differentiation, which is the average nearest distance

to the owner's other hotels. $ATTRI$ measures product differentiation adopted by multi-unit owners. The standard deviation of the quality of hotels in the same multi-unit owner is used to capture the product portfolio of multi-unit owners. $X$ contains control variables such as the owner's experience, the distance to the owner's headquarters, the average distance to the owner's other hotels, the percentage of chained hotels and the percentage of franchised hotels. $\tau$ measures time fixed effects. $\epsilon$ is the unobserved variable.

In addition, the regressions above control for many observed owner characteristics, as well as unobserved variables. However, the approach may not control for the endogenous problem of the product portfolio. That is, the multi-unit owners might decide whether the portfolio of a brand in a particular location will be vertical or horizontal. Previous studies have shown that product market strategies are affected by ownership structure (Amit and Zott, 2001; Kanlnis and Lafontaine, 2004; Perryman and Combs, 2012) and market characteristics (Carvell, et al., 2016). Therefore, this study tests for this endogenous effect for the product positioning of multi-unit owners in the sample by running the second stage OLS regression with instrument variables (IVs). The first stage of the model is

$$ATTRI_i = \theta_0 + \theta Z_i + \varepsilon_i, \tag{3.2}$$

where $Z$ contain the experience, the percentage of chained hotels, the percentage of franchised hotels, the distance to the owner's headquarters, and the average distance to the owner's other hotels.

**Dependent Variable**

**The degree of spatial differentiation.** The average nearest distance to the owner's other hotels is measured as the dependent variablehe.[7] One may expect that a smaller value of the average nearest geographic distance means that hotels are more likely to collocate together. To compute the geographic distance, this study uses longitude and latitude information of each hotel in Texas.[8] By using longitude and latitude information between hotels within the same multi-unit owner, the shortest line between nearest hotels is captured and then calculated the average value as the dependent variable.

**Independent Variables**

**Dummy variables for product market strategies.** Product differentiation has been examined to be a potential factor to influence geographic distances to incumbents (Baum and Haveman, 1997; Fischer and Harrington, 1996; Freedman and Kosova, 2012; Mazzeo, 2002; Urtasun and Gutierrez, 2006). The standard deviation of the quality of hotels in the same multi-unit owner is to capture the product portfolio of multi-unit owners. A larger value means that multi-unit owners would like to operate a vertical differentiation strategy, while zero value means that multi-unit owners operate a horizontal differentiation strategy.

**Control Variables**

**Firm-related variables.** Owners' characteristics might influence the geographic distance of establishments to their incumbents. **Experience** is measured as the age

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[7]In the literature, this is called as the distance-based agglomeration. An alternative is statistics-based agglomeration measures (i.e., U.S. states, U.S. metropolitan statistical areas, U.S. census division, or U.S. zip code).

[8]In STATA, the command geodist can be used to calculate the shortest distance between two hotels by using longitude and latitude information of each hotel.

of establishments by the difference between the starting and end years. Then, the maximum age of hotels within the same multi-unit owner is defined as the experience. The older multi-unit owner has a preemptive advantage to choose a "better" location.

**The distance to the owner's headquarters** (miles), **the average distance to the owner's other hotels** (miles), **the percentage of chained hotels** and **the percentage of franchised hotels** are the possible factors to affect how multi-unit owners choose their product portfolio (Baum and Haveman, 1997; Combs and Ketchen, 2003; Freedman and Kosova, 2012; Kalnins and Lafontaine, 2004, 2013; Kaufmann and Dant, 1996; Perryman and Combs, 2012). For all the businesses in the data, we geocode latitude and longitude coordinates for the business and owner's address. We then calculate the distance in miles from each of the businesses to its owner's headquarters and to its other hotels separately. Multi-unit owners who operate multiple high-end hotels are more likely to venture farther from the owner's headquarters becasue they believe they can be sucessful (Kalnins and Lafontaine, 2013; Kosova and Sertsios, 2018). The shorter distance to the owner's other hotels means that the competition among hotels within the same owner becomes intense, especially for the hotels with the similar resources (Baum and Mezias, 1992; Freedman and Kosova, 2012; Kalnins, 2016).

As quality differentiation is high, short distance among members would be sufficient to mitigate competition. While with low quality difference, competition would reach out to more distant hotels (Lee, 2015). The distance to the owner's other hotels might affect the incentive of multi-unit owners to choose their product portfolios in order to reduce intra-firm competition. The percentage of chained hotels and the

percentage of franchised hotels are used to measure the market structure that might influence the strategic choice of multi-unit owners. The high-end hotels are more vulnerable in presence of more neighboring hotels because these neighbors tend to erode their value (Kalnins, 2017). The low-end hotels can benefit more from the market with a high percentage of chained hotels and are more likely to present in the market with a high percentage of franchised hotels. The strategic choice of hotel owners might vary based on the competitive landscape of the market (Kalnins, 2017).

### 3.5.2 Results

The dependent variable in Table 3.3 is the average nearest distance to the owner's other hotels. If the number is large, it means that the location portfolio tends to more dispersed. The mean nearest distance estimates in Table 3.3 show the results from the OLS in column 1. This model shows a positive and insignificant coefficient on the product differentiation variable. The number of the F-test does not lower than 0.05, which means that this model cannot correctly explain the relationship between product differentiation and the average nearest distance to the owner's other hotels.

Column 2 reports the result from fixed effect models with controlling year dummies and unobserved firm fixed effects. The positive and significant coefficient on product differentiation means that product differentiation will increase the average nearest distance to the owner's other hotels in 5.21 miles. The number of the F-test does not lower than 0.05, which means that this model cannot correctly explain the relationship between product differentiation and the average nearest distance to the owner's other hotels. We incorporate several control variables and re-run the model. The results are shown in column 3. The model shows that the effect of product dif-

ferentiation has a positive and significant impact on the average nearest distance to the owner's other hotels. The product portfolio increases location portfolio in 13.30 miles. Experience has a positive and significant influence, which is 1.46. This means that more experienced multi-unit owners have a more dispersed location portfolio. The effect of the percentage of chained hotels also increases the location portfolio in 15.65 miles. The average distance to the owner's other hotels enlarges the location portfolio in 1.87 miles. However, the percentage of franchised hotels and the distance to the owner's headquarters have negative and significant coefficients. The coefficients mean that these two factors dense the location portfolio of multi-unit owners. The number of the F-test lowerd than 0.05, which means that this model can explain the relationship between product differentiation and the average nearest distance to the owner's other hotels. A likelihood ratio test between models 2 and 3 does not reject the outperformance of model 3. Therefore, the incorporation of more control variables provides more explanations on the relationship between product differentiation and the average nearest distance to the owner's other hotels.

The choices of business models and product market strategies affect the market structure, and vice verse (Zott and Amit, 2008). Columns 4-7 of Table 3.3 report the results of the endogenous selection estimates to control for the potential problem. The values of within $R^2$, between $R^2$ and overall $R^2$ are small. However, the value of F-test is lower than 0.05, which means that this model can explain a significant portion of the average nearest distance to the owner's other hotels. Column 4 uses all independent variables as IVs in the first stage of 2SLS. The results show that experience, the percentage of franchised hotels, and the average distance to the owner's other ho-

tels reduce the incentive of multi-unit owners to choose vertical differentiation. The distance to the owner's headquarters has a positive and significant coefficient on the choice of product differentiation. However, the coefficient of product differentiation is insignificant.

Except for experience, all control variables (the distance to the owner's headquarters, the average distance to the owner's other hotels , the percentage of chained hotels and the percentage of franchised hotels) are used as IVs in the first stage of 2SLS which are shown in columns 6 and 7. Previous research has shown that product differentiaiton is affected by the geographic distances to incumbents (Baum and Haveman, 1997; Freedman and Kosova, 2012), by the ownership structure of the market (Kalnins and Lafontaine, 2004; Kaufman and Dant, 1996; Perryman and Combs, 2012), and by the distance to the owner's headquarters (Kalnins and Lafontaine, 2013). In addition, product differentiaton might vary based on the competitive landscape of the market (Kalnins, 2017). In column 6, the percentage of chained hotels has a negative and significant coefficient. This result implies that multi-unit operators in the market with a higher percentage of chained hotels are less likely to operate multiple cross-tier/same-chain hotels. In other words, they would like to operate same-tier/cross-chain hotels becasue their hotels can enjoy the spillover from the hotels within the same chain. As the increase in the chained hotels in a market, those hotels contribute more to the spillovers. Hotels within the multi-unit owner can be free riders to extract the positive externality. Hence, the multi-unit owner has no incentive to undertake vertical product differentiation. The distance to the owner's headquarters has a positive and significant coefficient on the choice of product differentiation, but has a small eco-

nomical estimate. This result implies that the distance to the owner's headquarters increases the incentive of multi-unit owners to undertake vertical product differentiation though the magnitude of the effect is tiny. The values of within $R^2$, between $R^2$ and overall $R^2$ are small, however, the value of F-test is lower than 0.05, which means that this model can explain a portion of product differentiation.

In column 7, product differentiation has a negative and significant impact on the location portfolio of multi-unit owners. The product portfolio reduces the portfolio of multi-unit owners in 190.97 miles. This size of the product differentiation effect is more than 290% of the mean of the average nearest distance to the owner's other hotels. The portfolio of location and product positioning results in a max-min equilibrium. The results do not reject Hypotheses 1 and 2. When multi-unit owners operate multiple cross-tier/same-chain hotels, they would like to cluster their hotels becasue of increased market power and enhance the spillover from intra-agglomeration. Moreover, experience has a negative and significant coefficient, which is 32.45. The size of the experience effect is more than 49% of the mean of the average nearest distance to the owner's other hotels. This means that experienced multi-unit owners may choose to locate their establishments together. The finding suggests that multi-unit owners' experience and knowledge might be local. The values of within $R^2$, between $R^2$ and overall $R^2$ are small, however, the value of F-test is lower than 0.05, which means that this model can explain a portion of the average nearest distance to the owner's other hotels. We also use Wald test to test model selections on experience. The Wald test rejects the null hypothesis of experience, which means that expereince is a significant factor on the average nearest distance to the owner's other hotels.

Insert Table 3.3 Here

## 3.6  Conclusion

Product differentiation is an important mechanism that firms manipulate to gain market power. This study uses spatial differentiation across different product market differentiation to show a empirical evidence of the spatial differentiation of hotels in Texas, controlling the fixed effects, with and without controlling for the endogenous selection problem. The literature on the two-dimension Hotelling model concludes that firms choose to maximally differentiate on the dominant characteristic and minimally differentiate on the dominated characteristic. We argue that, assuming the geographic location is the dominant characteristic and the brand is the dominated characteristic, the model implies that multi-unit owners will structure their portfolios of establishments to be geographically differentiated while choosing less differentiated brands. The results show that multi-unit owners who undertake horizontal differentiation become less differentiated in the portfolio of hotels as geographic differentiation increases. This implies a max-min equilibrium. The explanation is when a multi-unit owner chooses to operate multiple hotels in same-tier/cross-chain, price competition among hotels is still strong because of their similar, limited service hotels. As a result, hotels operated by the same multi-unit owner are located away far from each other. The other explanation, why leading to locations away from each other rather than a cluster of locations, is multi-unit owners want to capture more market share by the dispersion of the location pattern of hotels.

Alternatively, we argue that, if the geographic location is the dominated characteristic and the brand is the dominant characteristic, the model implies that multi-unit

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owners will locate their establishments near one another in a geographic space while choosing highly differentiated brands. The results show that the multi-unit owner who undertakes vertical differentiation locates their hotels together when brand differentiation is large enough. This result is consistent with the result from the traditional two-dimension Hotelling model, which implies a max-min equilibrium. Firms' differentiation on brand is large enough to soften price competition. The average distance of the pair hotel within the same multi-unit owner reduces as the increases in the standard deviation of product positioning. The average distance among hotels and product positioning are substitute in the presence of vertical differentiation.

This study makes several contributions to the two-dimension Hotelling model literature. First, this research introduces a new concept that horizontal and vertical differentiation can coexist in one industry. While previous studies on the two-dimension Hotelling model have not distinguished between these two kinds of differentiation, this distinction is important because the two types of differentiation are compositionally different so that they can provide theoretically different implications. Each differentiation can have different magnitude/weight on one dimension. Horizontal differentiation is the dominate on the location portfolio dimension, while vertical differentiation is the dominate on the brand portfolio dimension. The traditional concept of the two-dimension Hotelling models may be unclear when the researcher fails to consider the presence of both types of differentiation in one industry.

Second, the results show that the location decision of multi-unit firms is more complex than previous studies have suggested. The location pattern of multi-unit firms varies based on their product positioning. This situation opens a possibility

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that multi-unit firms strategically choose their location pattern differently: to maximize geographic pattern in the presence of horizontal differentiation and to minimize geographic patterns in the presence of vertical differentiation. This research shows that max-min (mix-max) is a possible equilibrium. As a result, this study shows that different types of product differentiation are important factors in the location decisions of multi-unit firms.

Third, the empirical analysis of the lodging industry shows a trade-off between two main dimensions of differentiation: the distance among hotels and the diversification on product portfolios. The test of the max-min equilibrium predicted by the theoretical two-dimension model tries to prove that not only the existing trade-off relationship, but the evidence supports the existence of the equilibrium. Incorporating the maximum and minimum differentiation on both location and product positioning dimensions, we find supports for both max-min and min-max equilibria, given the geographic location as first dimension and the product positioning as second dimension. The results imply that the weight of variables, so that the portfolio is maximally differentiated along that dimension, is important to determine which characteristic is dominant. The application of location equilibrium with the degree of product positioning suggests that more geographical proximity may imply the increase in the incentive of vertical differentiation.

The results of this study suggest the managerial implications for hotel operators to better understand the complexities associated with the portfolio dominance between location and product positioning. When hotel operators construct product positioning from one specific quality segment of hotels, the location portfolio of hotels is dispersed.

The portfolio, maximal location and minimal product positioning, leads to a larger market share and a smaller competition among hotel memebers within the multi-unit operator. When hotel operators construct product positioning from cross quality segments of hotels, the location portfolio of hotels is clustered. The portfolio, minimal location and maximal product positioning, can achieve the economies of scale and scope as well as the benefits from intra-agglomeration. Hence, hotel operators may consider the leverage of location versus product positioning at the beginning stage of their businesses.

# Table 3.3: Estimates Using Different Specifications

| The average nearest | Pooled OLS | Fixed effect | | | 2SLS | | |
|---|---|---|---|---|---|---|---|
| distance to the owner's | | | | 1st | 2nd | 1st | 2nd |
| other hotels | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Product differentiation | 5.33 | 5.21* | 13.30*** | | 1.80 | | -190.97*** |
| | (7.69) | (3.05) | (1.45) | | (3.64) | | (46.59) |
| Experience | | | 1.46*** | -.11*** | | | -32.45*** |
| | | | (.29) | (.00) | | | (7.74) |
| The percentage of | | | 15.65*** | -.28 | | -.58** | |
| chained hotels | | | (4.53) | (.18) | | (.23) | |
| The percentage of | | | -29.16*** | -.63* | | -.28 | |
| franchised hotels | | | (10.10) | (.35) | | (.42) | |
| The distance to the owner's | | | -.00*** | .00*** | | .00*** | |
| headquarters | | | (.00) | (.00) | | (.00) | |
| The avg. distance to the | | | 1.87*** | -.00** | | -.00 | |
| owner's other hotels | | | (.02) | (.00) | | (.00) | |
| Year dummies | Y | Y | Y | | Y | | Y |
| Firm fixed effects | N | Y | Y | | Y | | Y |
| Adj $R^2$ | -0.00 | | | | | | |
| Within $R^2$ | | 0.03 | 0.93 | 0.69 | 0.02 | 0.18 | |
| Between $R^2$ | | 0.00 | 0.74 | 0.00 | 0.00 | 0.00 | 0.00 |
| Overall $R^2$ | | 0.00 | 0.70 | 0.00 | 0.00 | 0.00 | 0.00 |
| Number of observations | 501 | 501 | 501 | 501 | 501 | 501 | 501 |
| Number of groups | | 110 | 110 | 110 | 110 | 110 | 110 |

Notes: * indictes p<0.10, ** indicates p<0.05, *** indicates p<0.01. Likelihood ratio test

and Wald test are used to test model selections.

## Table 3.4: Hotel companies in samples

| Hotel Company | Chain Brands |
|---|---|
| Intercontinental Hotels Group | InterContinental    Kimpton    Holiday Inn    Holiday Inn Express    Hotel Indigo    Crowne Plaza    Staybridge Suites    Candlewood Suites |
| Carlson Hospitality Company | Radisson    Park Inn    Country Inn & Suites |
| Choice Hotels International | Cambria Suites    Clarion    Comfort Inn    Comfort Suites    Quality Inn    Sleep Inn    Suburban Extended Stay |
| Hilton Worldwide | Conrad    Embassy Suites    Hilton    Curio Collection    Double Tree    Hilton Garden Inn    Homewood Suites    Hampton Inn    Hampton Inn & Suites    Home2 Suites by Hilton |
| World of Hyatt | Hyatt    Hyatt House    Hyatt Place    Hyatt Regency |
| Marriott International | W Hotel    JW Marriott    Autograph Collection    Marriott    Courtyard    Residence Inn    Springhill Suites    Fairfield Inn    TownePlace Suites    Le Meridien    Sheraton    Westin    aloft Hotel    Four Points |
| Wyndham Worldwide | Wyndham    Ramada    Baymont Inn & Suites    Hawthorn Suites    Days Inn    Howard Johnson    Knights Inn    Microtel Inn & Suites    Super 8    Travelodge |
| LQ Management LLC | La Quinta Inn & Suites |
| G6 Hospitality | Studio 6    Motel 6 |
| Citigroup Global | Red Roof Inn |
| Drury Hotels | Drury Inn |
| Best Western Company | Best Western    Best Western Plus |
| Red Lion Hotels Corporation | America's Best Value Inn |

## Table 3.5: Product Portfolio in Samples

| | Year | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | |
| Horizontal Differentiation | 36 | 36 | 40 | 35 | 36 | 35 | 37 | 37 | 292 |
| Vertical Differentiation | 24 | 23 | 24 | 28 | 27 | 29 | 28 | 26 | 209 |
| Total | 60 | 59 | 64 | 63 | 63 | 64 | 65 | 63 | 501 |

Table 3.6: Multi-unit Owners in samples

|  | Year | | | | | | | |
|---|---|---|---|---|---|---|---|---|
|  | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Multi-unit Owners | 60 | 59 | 64 | 63 | 63 | 64 | 65 | 63 |

# Chapter 4

# The choices of product differentiation and ownership structure on the evolution of agglomeration

## 4.1 Introduction

The geographic distribution of firms is not random. Numerous empirical studies have confirmed that firms have strong incentives to locate in close proximity (Rosenthal and Strange, 2003). Why do firms geographically collocate together in a specific area? Previous studies have provided two opposite arguments against the effect of agglomeration on firms' location decisions. On the one hand, agglomeration would create a positive externality, for example, heightened demand, consequently attracting more firms to the specific cluster (Peiro, et al., 2015). In the manufacturing sector, firms could enjoy a number of benefits from clustering with other firms, including the ability to share infrastructure and inputs, to draw on a larger pool of labor, and to take advantage of knowledge or demand spillover (Marshall, 1920). On the other hand, agglomeration might induce localized competition among firms as a negative externality, eventually reducing the survival rate of incumbents and attracting fewer firms

to the specific cluster (Baum and Mezias, 1992; Shaver and Flyer, 2000). Agglomeration could interact with firms' product market strategies and in particular their efforts to differentiate their goods and services. In addition, the agglomeration effect on firms might not be homogeneous. The introduction of establishment-level heterogeneity implies that firms in a cluster are exposed to vary with the levels of positive and negative externalities (Canina, et al., 2005; Chung and Kalnins, 2001; Kalnins and Chung, 2004; Shaver and Flyer, 2000). Some firms are more likely to create positive externalities than others do, but they benefit less from the positive externalities than others do. However, the literature on agglomeration has not provided enough empirical evidences to bring the opposite effects of positive and negative externalities together.

Previous studies have assumed that firms have only one establishment in a cluster such that firms always collocate together with their competitors. However, when firms operate several business establishments across geographic markets, they often collocate not only with competitors but also with their own establishments in a cluster. The business establishments of the same owners might collocate near each other in a cluster due to some externalities. Therefore, agglomeration does not mean only geographic collocation with competitors but also with the business establishments of the same owners.

The choice of the ownership structure of entrants might affect the competitive environment of the market (Canina, et al., 2005; Delgado, et al., 2010; Kalnins, 2004, 2017; Mazzeo, 2004) and the different types of branded hotels contribute differently to spillover (Canina, et al., 2005; Yang and Mao, 2017). The introduction of ownership

structure would raise the question about how the hotels interact in a cluster and how their interactions affect the evolution of the cluster. This paper analyzes the synergistic effect of ownership structure and product market strategy on the degree or intensity of agglomeration.

This study examines the synergistic effect of ownership structure and product market strategy on the evolution of agglomeration across all identifiable hotel chain locations in Texas. In the empirical application, we take advantage of unique establishment-level panel data that cover nearly all existing hotel properties in Texas from 2010 to 2016. The data include not only the birth/death date, size, affiliation and geographic location of hotels, but also detailed information about the quality segments. These segments distinguish independent from branded hotels, and further divide branded hotels into six distinct categories ranging from economy to luxury. This research control for differences in the quality, or amenity level, of hotel brands using hotel brand service levels (e.g., "economy", "midscale", "upper midscale", "upscale", "upper upscale", and "luxury") defined by STR Global, a lodging industry research organization, by matching business name responses with the STR Global classification list. In addition, the residential population and the average income of each zip code, from the American Community Survey's (ACS) 2010-2016 report, capture the effects of market wealth and market size. The County Business Patterns (CBP) from the U.S. Census Bureau in 2010-2016 includes the number of establishments in the food services sector. Without these variables, the area-specific effects caused by markets' economic size and wealth may be misattributed to existing hotel counts in that market.

Unlike other industries in which service and quality offerings are difficult to measure, this research can measure product heterogeneity among establishments more precisely because of the unique hotel segments. Moreover, the panel nature of the data allows us to control for, among other things, unobserved location differences at highly detailed levels as well as segment-specific impacts of aggregate shocks. This helps us to address some of the endogenous problems and selection issues that limit previous research and, therefore, to shed new light on how the synergistic effect of product market strategy and ownership structure shapes industry dynamics and eventually the spatial distribution of firms.

The analysis of ownership structure and product differentiation complements and extends previous research in several ways. First, while most studies have analyzed the role of product differentiation in influencing market structure or performance, this study constructs on how ownership structure affects the interaction of product differentiation and agglomeration. We focus on the overall industry dynamics and analyze the evolution of agglomeration over time and across locations. Second, previous studies have relied only on small samples of potentially unrepresentative firms in only one family of hotels or in very specific areas (e.g., Manhattan) or time periods. This study has the universe of establishments in existence in the lodging industry in Texas between 2010 and 2016. Having highly detailed information on the market segment of establishments in the data allows a closer analysis of the extent of product differentiation and ownership structure and the nature of interactions between firms. Finally, the rich panel data allows us to control for local market characteristics at highly detailed geographic levels and thereby minimizes potential biases due to omit-

ted variables and selection problems. For example, one might expect that richer areas or large and growing tourist destinations would experience not only more hotels overall but also variations in the number of quality segments across hotels. Take advantage of time, geography and segment variations in the data, this research can control for various sources of both unobservable and observable heterogeneity, which allows us to identify how the patterns of ownership structure and product differentiation are related to the composition of existing firms in an area.

This study incorporates the idea of multi-unit owners into the demand-heightening agglomeration theory relevant to retail and service firms, arguing that multi-unit owners will establish a new high-end hotel in a cluster characterized by a high count of low-end hotels as long as there are other existing member hotels in a cluster. The result implies that the intra-firm spillover effect outweighs the negative effect of the agglomeration with a high count of low-end hotels. In addition, the multi-unit owner who operates multiple cross-tier/same-chain hotels will locate a new high-end hotel in the vicinity of some other low-end hotels only if one of these incumbents belongs to the multi-unit owner. The benefit from product differentiation undertaken by multi-unit owners may exceed the negative externality from the cluster with high counts of low-end hotels.

This article is organized as follows. The next section reviews the related literature on agglomeration and product differentiation and discusses the two phenomena in the context of the hotel industry. Section 3 constructs the theoretical background and hypotheses. Section 4 describes the data in the empirical application and separately presents descriptive statistics on entry patterns at an establishment level and at a

multi-unit level in the Texas hotel industry. The empirical approach and results are present in Section 5. Section 6 concludes.

## 4.2 Literature Review

### 4.2.1 Literature on agglomeration and product differentiation

The location choice of firms is not randomly distributed. Marshall (1920) introduces several location advantages to explain why specialized industries tend to collocate together. He highlights four specific advantages resulting from agglomeration in specialized industries–specialized labors, specialized non-labor inputs, knowledge spillovers, and heightened demands. The first three types of specific advantages are supply-side agglomeration. The last type is the demand-side agglomeration. These two types of agglomerations are called agglomeration externalities (McCann and Folta, 2008).

Demand-side agglomeration refers to the customer perspective in which the collocation of firms creates heightened demands (Marshall, 1920). As the collocation of firms provides similar products or services to customers in a specific area, this collocation tends to reduce consumers' search costs, which, in turn, heightens demands. For example, the establishments provide accessories, clothing, spectacles, handbags and luggage, jewelry, and so on. Customers can reduce their search costs because they can directly visit outlets to purchase what they want without visiting other areas. Furthermore, the collocation between firms in a specific industry may signal customers about the level of demand in local areas and provide legitimacy to firms in these areas when the uncertainty over products or services is not high (McCann and Folta, 2009). For instance, tourists would like to visit the areas where more hotels

are collocated. The concentration of hotels may signal that these local areas are safe or convenient places to stay. Since customers have less information about local areas, they may tend to stay at one of the hotels in the cluster. The positive externality in demand-side agglomeration is important in retail and service industries, for example, fast-food restaurants or hotels because firms face difficulties to serve customers who do not visit the destination. The collocation of firms helps to attract customers to their destination.

Two countervailing effects, agglomeration and competition, exist when hotels collocate together. Agglomeration acts as centripetal forces that may drive the cluster of firms, while competition acts as centrifugal forces that may drive the dispersion of firms. The positive agglomeration effect results from differentiation spillover, while the competition effect is from collocation (Canina, et al., 2005). Hotels can enjoy a number of benefits from clustering with others, which raises the heightened competition among hotels (Peiro-Signes, et al., 2015). Whether or not firms collocate together is based on the magnitudes of agglomeration effects and competition effects (Alcacer, et al., 2015). Choosing to locate close to a large number of other hotels does not always lead to beneficial outcomes. Baum and Mezias (1992) find that hotels similar to their neighbors experience higher failure rates because of the heightened competition from the agglomeration. The greater similarity implies greater localized competition for targeting customers. Hotels might face intense competition for limited customers during the offseason. In addition, when more hotels collocate together in the cluster, they may compete for scarce resources. In this case, firms in the cluster may have low survival rates as the level of agglomeration increases. Baum and Haveman (1997)

observe that entrants choose to locate with neighboring hotels when the magnitude of agglomeration is moderate. When the concentration is large enough, an increased number of hotels tends to deter new entrants (Canina, et al., 2005) and the collocation of hotels might result in negative agglomeration spillovers (Ingram and Roberts, 2000). Thus, the agglomeration would interact with firms' product market strategies, and in particular their efforts to differentiate their products or services.

Even if hotels benefit from agglomeration, the agglomeration effect is heterogeneous among hotels. Several studies have found that it depends heavily on product heterogeneity between entrants and incumbents nearby (Canina, et al., 2005; Chung and Kalnins, 2001; Freedman and Kosova, 2012; Kalnins and Chung, 2004, 2006; Mazzeo, 2002; Yang and Mao, 2017). Low-end, small, and independent hotels have incentives to locate close to high-end, large, and branded hotels or to locate in the market with high counts of high-end hotels (Chung and Kalnins, 2001; Kalnins and Chung, 2004, 2006; Mazzeo, 2002), but upscale hotels avoid locating with other types of hotels (Kalnins and Chung, 2006). Upscale hotels are more likely to generate spillovers to their neighbors. Canina, et al. (2005) assert that luxury hotels benefit less from agglomeration. Freedman and Kosova (2012) show that hotels accrue uneven benefits from agglomeration. Yang and Mao (2017) underscore that franchised hotels contribute largely to spillover to independent hotels. Thus, the agglomeration effect is not uniformly distributed across hotels and this effect varies with ownership types, sizes, and product market strategies.

On the other hand, product differentiation in terms of quality is acted as a key factor in mitigating the intensity of competition (Mazzeo, 2002; Lee, 2015). Hotels

located close to their rivals become natural competitors if they offer similar quality products, resulting in the outcome of lower revenues (Baum and Mezias, 1992). Hotels that are more likely to enjoy agglomeration benefits by locating close to one another will differentiate themselves on produce space (Baum and Haveman, 1997; Fischer and Harrington, 1996; Mazzeo, 2002). For example, as hotel owners provide the hotels with different quality segments in a cluster, differentiation in products will be an effective tool in reducing competition. As a result, the greater the product heterogeneity, the greater the likelihood of a cluster and, if there is a cluster, the more firms will locate there (Fischer and Harrington, 1996; Freedman and Kosova, 2012).

The magnitude of differentiated agglomeration will affect entrants' incentives to participate in this specific market. Agglomeration externality may heavily depend on market conditions (Lee and Jang, 2015). Canina, et al. (2005), Enz, et al. (2008), Graf (2011), Kalnins and Chung (2004), and Tsang and Yip (2009) argue that the entrance choice of firms depends on the nature of their strategic orientations and their strategic distances to rivals. Lower level hotels rely on agglomeration spillover more heavily in a cluster (Yang, et al., 2012). Moreover, the nature of the strategic orientation also influences agglomeration externality (Canina, et al., 2005). Yang and Mao (2017) conclude that the dominant role of luxury brand hotels is spillover generators, both upscale and midscale brand properties partly contributes to this spillover, and economy brand hotels barely generate spillover. The literature on agglomeration concludes that lower level hotels are inclined to locate in a cluster with higher level hotels (Alcacer and Chung, 2014; Alcacer, et al., 2015; Canina, et

al., 2005; Enz, et al., 2008; Freedman and Kosova, 2012; Kalnins and Chung, 2004, 2006; Yang, et al., 2012).

As the introduction of an establishment-level heterogeneity into agglomeration, it is no longer valid that the assumption on agglomeration where all firms within a cluster are under the same influence of externalities. Firms might be heterogeneous in terms of contribution to and benefit from agglomeration. Some firms may create positive externalities but do not capture positive externalities as much. Other firms might benefit from positive externalities created by others but do not create positive externalities as much. This asymmetry between contributions and benefits at an establishment level heterogeneity sheds new light on studies of agglomeration. Therefore, this asymmetry influences firms' strategic choices and outcomes in different ways.

## 4.3   Theoretical Background and Hypotheses

Agglomeration theory explains why firms are more likely to cluster together even if these firms compete with each other. Cluster together will make competition among firms more severe. Nevertheless, the collocation of competitors is especially common, for example, in retail and service industries such as fast food restaurants and hotels. Similar businesses may cluster together for the convenience of the consumer. The collocation of firms can attract consumers by providing a variety of products or services because those consumers can reduce their searching costs (Stahl, 1982). When products, called experience goods, require visual inspection by consumers (Stahl, 1982) and when product heterogeneity among firms is high (Fischer and Harrington, 1996), the benefit from this type of agglomeration is obvious. The revenue of firms will in-

crease as consumers' demands. Thus, agglomeration theory suggests that firms in the geographical clustering lead to higher performance because of heightened demands (Marshall, 1920).

In a cluster, firms may either specialize or differentiate their products or services to their rivals in order to reduce direct or indirect competition among firms. Firms that offer differentiated products can mitigate competition because their offers are not viewed as substitutes for consumers (Mazzeo, 2002). The high-end hotels create superior values for their customers by offering the uniqueness of the architecture, large rooms, conference rooms, room service, or recreational facilities (Canina, et al., 2005). Consumers with specific preferences can be satisfied in the geographic market characterized by different types of firms. Firms that provide differentiated products can benefit from the agglomeration externality. Other firms will enter in this cluster with a positive externality. The more differentiated products, the larger agglomeration externalities. Firms, providing differentiated products in a cluster, not only benefit from but also contribute to the agglomeration externalities. The markets characterized by greater product heterogeneity will exhibit stronger incentives for firms to agglomerate (Fischer and Harrington, 1996). More consumer demand attracts firms to cluster only when the effect of heterogeneous products is substantial and strong to counterbalance the increased competition resulting from agglomeration. Retailers with greater abilities to differentiate their products are more likely to cluster geographically (Picone, et al., 2009). Low-end hotels benefit from proximity to high-end hotels, while high-end hotels lose values from locating near low-end hotels (Canina, et al., 2005). In addition, the strategic distance among firms magnifies agglomeration

spillover. That high-resource hotels avoid the market with high counts of low-resource hotels (Kalnins and Chung, 2004). Moreover, the owners of high-resource hotels may find it beneficial to control nearby low-resource hotels (Kalnins and Chung, 2004). The benefits that the high-resource hotels generate can be captured by the collocated same-brand low-resource hotels. Therefore, the entry pattern of the establishments plays a key role in the evolution of agglomeration.

When a firm operates only one unit, it will collocate with its competitors in a cluster. However, a firm might operate multiple units. A multi-unit firm becomes common business ownership in many industries, such as fast-food restaurants, banks, and hotels. Units within a multi-unit firm not only collocate with competitors in a cluster but also collocate with other units within the same owner. The introduction of multi-unit ownership as a component of agglomeration implies that the agglomeration can be separated into two types: intra- and inter-firm agglomerations. Intra-firm agglomeration means the geographic collocation of establishments with others within the same multi-unit owner, while inter-firm agglomeration means the geographic collocation of estanlishments with their competitors in a cluster. The separation between intra-firm and inter-firm agglomerations of multi-unit owners might alter the conclusion in the agglomeration literature. Our main argument is that multi-unit owners can extract more agglomeration benefits and eliminate more threats of localized competition if they collocate together with their other establishments than with their competitors. In other words, multi-unit owners would choose to enter a geographic market even if the localized competition is severe because the benefit from collocation with their establishments overcomes the loss from localized competition in a cluster.

In the cluster characterized by positive externalities, multi-unit firms can benefit from the inter-firm agglomeration. When a multi-unit firm collocates with its competitors, it is more likely to benefit more as its geographic proximity to competitors. For example, if one hotel's rooms are full, customers might choose another hotel nearby. The geographic proximity to the hotel might influence the customers' decisions to choose one of the adjacent hotels. Another positive externality results from the reciprocal cooperation between focal firms and competitors. The referral practice and the call around practice are two popular cooperation practices to extract benefits from positive externalities (Kalnins, 2006). Hotel owners might send overflowed customers to other hotels reciprocally or call each other to share key information. This information exchange helps hotel owners to decide where to send overflowed customers.

Multi-unit firms can also benefit from the intra-firm agglomeration. Geographic proximity to establishments operated by the same owner will benefit each other. Another positive externality results from the formal cooperation within multi-unit firms. This formal cooperation within multi-unit firms might substantially contribute to intra-firm agglomeration. If adjacent other hotels of the same owner have rooms available, one focal hotel might send overflowed customers to those hotels. Formal cooperation within multi-unit firms leads the establishment of the same owner share more precise information. Thus, multi-unit firms benefit more from intra-firm agglomeration than single-unit firms do.

In the cluster characterized by a negative externality, the collocation of multi-unit firms with competitors can eliminate the threats from the increased localized compe-

tition, which is a threat to firms' survival (Baum and Mezias, 1992). When multi-unit firms collocate with competitors, tacit coordination might be one way to reduce the intensity of competition between firms. On the other hand, the establishments under the same multi-unit owner collocate with each other can reduce localized competition through formal coordination. The advantages of multi-unit firms can be an improvement of efficiency and resourcefulness, entry deterrence to rivals, protection from cooperation, and enhanced profits (Kalnins, 2004). The ownership structure of entrants in a market substantially changes the competitive landscape of the market (Kalnins, 2017). The competitive position from the differentiaiton established by incumbents is easy for new entrants to imitate (Enz et al., 2014). In sum, multi-unit firms might neutralize the negative externality from the increased localized competition by intra-firm agglomeration.

**Hypothesis 1.** *Multi-unit owners have influences on the evolution of agglomeration.*

### 4.3.1 The effect of the product differentiation of multi-unit owners on agglomeration

The literature on agglomeration less addresses the relationship between the product differentiation of multi-unit owners and agglomeration. The product differentiation of multi-unit owners means that multi-unit owners operate cross-tier/same-brand hotels in a territorial encroachment. The differentiation advantage is facilitated more in multi-unit owners than single-unit owners (Garg, 2013) and successful and experienced multi-unit owners exert their tacit knowledge, through practice is a powerful source of comparative advantage, to yield higher performance outcomes over time

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(Enz, et al., 2013). Multi-unit owners who open up additional establishment may enjoy the low risk of establishment closure due to its substantial experience (Bates, 1998). The scale economies are related to learning in multi-unit owners (Darr, et al., 1995).

The collocation of hotels allows observe and learn from their neighbors and, in turn, is beneficial to respond to rivals' moves. Midscale and upscale hotels have incentives to collocate together because of sharing various inputs and infrastructure (Freedman and Kosova, 2012). The source of advantages in a competitive cluster is called differentiation spillover (Canina, et al., 2005). The benefit for hotels in a cluster from differentiation spillover is not uniform (Canina, et al., 2005; Freedman and Kosova, 2012). Hotels with low-end tier benefit more from the cluster characterized by a high percentage of hotels that pursue a high level of differentiation, while hotels with high-end tier will avoid locating in a market where there is a high percentage of low-end tier hotels (Canina, et al., 2005). Midscale hotels may benefit more from the presence of upscale hotels (Freedman and Kosova, 2012). Luxury hotels are the main spillover generators, both upscale and midscale brand properties partly contribute to these spillover, and economy brand hotels barely generate spillover (Yang and Mao, 2017). The ownership structure of entrants in a market might substantially change the competitive structure of the market (Delgado, et al., 2010; Kalnins, 2017). The literature above concludes that the agglomeration spillover results from inter-firms will affect firms' behavior and, at the same time, firms' strategic orientations will also influence the structure of agglomeration.

However, there is also one spillover resulting from intra-firm. A multi-unit orga-

nization can improve its routines through transfer learning among its different units, resulting in spillover among the units (Darr, et al., 1995). A network tie, like geographical proximity, provides an opportunity to help group members (Kalnins and Chung, 2006). The spillover from group members benefits more for low-resource group members than it does for low-resource nonmembers. The cooperation among group members creates a competitive advantage against nonmembers in the same market. Hotels operated by the multi-unit owners who own cross-tier/same-brand hotels will benefit from the same strategic group. Knowledge transfer between commonly owned establishments would be greater than a transfer between different owners' establishments (Darr, et al., 1995). In addition, group members tend to intensify internal linkages when neighboring rivals share the same product market (Alcacer and Zhao, 2012).

We propose that multi-unit owners have incentives to enter in a cluster with a high count of low-end tier hotels as long as there is one of the members belongs to the multi-unit owners for two reasons. First, the high-end hotel within the multi-unit owner can enhance the agglomeration spillover, making the cluster more attractive. The sequential hotels of multi-unit owners can benefit from improved agglomeration spillover, which results from inter-firm. Second, the sequential hotels of multi-unit owners can benefit the most from their existing high-end hotels because the use of a common umbrella brand enhances brand loyalty (O'Neill and Xiao, 2006). This intra-firm spillover effect overcomes the negative effect from the cluster with a high count of low-end hotels. Thus, this study hypothesizes that the strategy, multi-unit owners operate cross-tier/same-brand hotels, is a mediator to reduce the negative

effect of the agglomeration characterized by a high percent of low-end hotels.

**Hypothesis 2.** *Multi-unit owners who operate cross-tier/same-brand hotels reduce the localized competition in a cluster.*

Multi-unit owners may simultaneously operate same-tier/cross-brand hotels in a competitive market. The same-tier hotels own similar resources and thus their abilities to contribute agglomeration spillover are similar. Upscale and midscale hotels exert a partial contribution to spillover (Yang and Mao, 2017). Thus, the multi-unit owners who operate same-tier/cross-brand hotels can improve the agglomeration spillover of markets characterized by a high percent of low-end hotels.

In addition, multi-unit owners who operate same-tier/cross-brand hotels can attract different consumers who have different preferences on brand loyalty. Consumers are more likely to choose particular segments of hotels than to a specific brand (Skogland and Siguaw, 2004). More cross-brand hotels operate, larger market shares capture. On the other hand, multi-unit owners can transfer their customers to their other hotels if there is no enough room in one of their own hotels. Moreover, in the agglomeration with a high percent of low-end hotels, these multi-unit owners' hotels can attract those consumers who have specific brand preferences but desire higher tier hotels in the same brand. Therefore, the strategy of product differentiation, operating same-tier/cross-brand hotels, reduces the localized competition.

**Hypothesis 3.** *Multi-unit owners who operate same-tier/cross-brand hotels reduce the localized competition in a cluster.*

## 4.4    The Data

The empirical context of the industry is the hotel industry, which is a part of the services sector in the economy. The hotel industry in Texas services as the empirical setting, which provides a rich setting for the empirical research because of its large size, the diversity of the state, and the availability of reliable data. Local competition characterizes this industry, as hotels compete with their rivals in the same geographic area but not with ones in other parts of the state or country. Hotels compete on a variety of dimensions, including quality, location, service levels, the range of product offerings, and price. The primary source of data is from the State of Texas Comptroller's Office,[1] a public hotel tax file.[2] The data are particularly trustworthy because incorrectly reporting is considered an unlawful behavior. The data include all hotels operating in Texas at some points between 2010 and 2016, with the owner's name and the address, the hotel's name (including any brand affiliation), the hotel's address, hotel capacity, quarterly revenues, and entry and exit dates. These data allow us to analyze how the market structure is influenced by the decisions of product quality and ownership made by hotel owners.

Several important distance measures are used as control variables because owner and market characteristics make some markets more attractive than others. The distance measures are the average distance to the entrant's neighbors within a radius of 3 miles, the number of hotels from the entrant within a radius of 3 miles, and whether

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[1] The data have been used by Chung and Kalnins (2001), Hollenbeck (2017), Kalnins and Chung (2004), McCann and Vroom (2010), Suzuki (2013), Vroom and Gimeno (2007), and Yang and Mao (2017).

[2] The Texas hotel receipts data are public information under Section 552.002 of the Texas Government Code, and prior to May 4, 2017, is publicly accessible from the Texas Comptroller's website. More information on this data is available here: https://comptroller.texas.gov/.

the owner's other hotel exists within a radius of 3 miles.[3] These control variables are used because new establishments are more likely to be near to the neighbors and the owner's existing outlets due to localized searching (Baum et al., 2000). To compute geographic distance, this study uses longitude and latitude information of each hotel. By using longitude and latitude information between a new establishment and an incumbent, the shortest line between two hotels is calculated.

Several market-level attributes are included to capture some area-specific benefits.[4] As Rosenthal and Strange (2003) point out, entrants are more likely to make their location decisions taking existing market conditions and business environments as given. For example, larger and wealthier markets are more likely to attract more hotels. Therefore, for each market, the residential population in the American Community Survey's (ACS) 2010-2016 report is included. Similarly, the average income of each zip code is also included to capture the effect of market wealth. The County Business Patterns (CBP) from the U.S. Census Bureau in 2010-2016 include the number of establishments in the sector of food and accommodation. Without these variables, the area-specific effects caused by a market's economic size and wealth may be misattributed to existing hotel counts in that market.

The hotels in the samples are categorized in terms of the quality segment. This study matches the response names in the Texas data with the Smith Travel Research's 2016 U.S. Chain Scale index.[5] Smith Travel Research is the lodging industry's lead-

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[3]Baum and Mezias (1992) use 3 revenues or 25 streets (around 3 miles) from a new establishment as the distance range of agglomeration in the Manhattan hotel industry, and they also use several alternative distances for robustness checks. Here, we use alternative distance measures, which are 1 and 5 miles, for robustness check.

[4]The market boundary is defined as the five-digit zip code level.

[5]This research identifies the segment of each hotel by using the STR chain scales in 2016. The rating of the hotel segment is divided into six categories in the STR. We assign a one-digit number to each quality segment: economy (=1), midscale (=2), upper mid-

ing information and data provider, with the most comprehensive data of hotel performance information available.[6] This index categorizes hotel brands into six quality segments: economy, midscale, upper midscale, upscale, upper upscale, and luxury.[7] This study classifies hotels into segments for three main purposes: to count the agglomeration level, to determine market competition and to create product market strategies. Descriptive statistics for all variables in the establishment level are presented in Tables 1 and 2. Table 3,4 provides summary statistics of the variables in the multi-unit level.

## 4.5 Empirical Method and Results

### 4.5.1 Model Specification

The conditional logit model is utilized to test the above hypotheses.[8] Conditional logit models have been used for discrete choices made by firms in a geographic market (Alcacer and Chung, 2014; Head et al., 1995; Kalnins and Chung, 2004; McFadden, 1974; Shaver and Flyer, 2000). Conditional logit models are the most appropriate for such an analysis because it allows the direct comparison of many discrete choices. Markets possessing high values of the variable that receives a positive coefficient have a higher probability of being chosen, exactly the format of the hypotheses. Negative coefficients indicate lower probabilities of being chosen.

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scale (=3), upscale (=4), upper upscale (=5), and luxury (=6). For the STR chain scales, see http://hotelnewsnow.com/Media/Default/Images/chainscales/pdf

[6]While Smith Travel Research has the most comprehensive data, the company will not release performance data that may be identified at the individual hotel level. This makes the database unsuitable for research requiring detailed information at the establishment level.

[7]This index has been used for control of the hotel quality in many research, such as Kalnins and Chung (2004), Lee (2015), Lee and Jang (2015), McCann and Vroom (2010), and Yang and Mao (2017).

[8]To assess the robustness of the results, we estimate the above entry decision regression under a linear probability model, a probit model, and a logit model.

For the entry analysis, the dependent variable is an indicator variable for whether the hotel enters the market in the sample period. This study examines the effect of multi-unit owners and other factors on conditional entry as follows.

$$P(Y_{i,m,t} = 1) = f(Multiunit_{i,m,t}, \ X_{i,t}, \ M_{i,m}, \ T_t, \ \varepsilon_{i,m,t}), \tag{4.1}$$

where the subscript $i$ identifies that one hotel enters the market at the zip code $m$ during the sample period $t$. $Y$ is equal to 1 if the hotel enters the market. The $X$ vector includes business characteristics such as yearly revenues, the number of hotels in a cluster, the average quality of the cluster and the percentage of food and restaurant sectors in the cluster.

Heterogeneity in the economic environment is correlated with the entry decision of firms (Mazzeo, 2004), thus we also include market-level (zip code) characteristics such as the mean household income and demographic characteristics of the zip code's population, denoted by $M$. To account for various common but unobserved constant factors associated with the sample period, this study includes a set of survey year fixed effects, denoted by $T$. Any remaining effects of these characteristics beyond these fixed effects will be captured by the error term in the above equation.

**Dependent Variable**

**New entry.** For the test of Hypothesis 1, four alternative entry patterns are examined. The first dependent variable is whether one new hotel enters the market during the period in 2010-2016, which is equal to 1 if the hotel enters the market during the sample period, and 0 otherwise. The second dependent variable is one

low-end hotel enters the cluster characterized by high counts of high-end hotels. The third dependent variable is whether one high-end hotel enters the cluster by the presence of low-end incumbents. The fourth dependent variable is whether one high-end hotel enters into a high count of the low-end cluster in which there exists one of the members.

**Independent Variables**

**Dummy variable for the ownership structure.** The dummy variable of multi-unit owners is indexed as 1 if hotels are operated by multi-unit owners, while it is coded as 0 if the hotel is the only hotel owned by that owner. Multi-unit owners might enjoy the benefits from economies of scale and scope and market power compared with single-unit owners.

**Dummy variables for product market strategies.** Product differentiation has been considered as a potential factor to influence the entry pattern of hotels (Baum and Haveman, 1997; Freedman and Kosova, 2012; Kalnins and Chung, 2004). The standard deviation of the quality of hotels in the same multi-unit owner is used to capture the product portfolio of multi-unit owners. A larger number of the standard deviation of the quality means that multi-unit owners are more likely to operate multiple hotels in different quality segments, while zero value means that multi-unit owners operate multiple hotels with the same quality segment.

**Control Variables**

**Agglomeration-related variables.** Several variables are controlled: the number of hotels from the entrant within a radius of 3 miles, the average distance of

entrants to their incumbents within a radius of 3 miles, and the average quality of the cluster within a radius of 3 miles. This is because the agglomeration effect is specific to each product quality tier of hotels (Kalnins and Chung, 2004). As more high-end hotels exist in a market, a new hotel is more likely to enter this cluster to benefit from agglomeration externalities (Kalnins and Chung, 2004). As more incumbents are present near a new entrant, the average distance to them is shorter. In addition, competition among hotels becomes severe if more hotels are located in a cluster. In this case, hotels may be unable to enter the market because of the increase in localized competition.

**Market-related variables.** Several market-related variables are used to control for time-varying area effects because entrants' location decision is affected by overall standards of living, population, and restaurants (Freedman and Kosova, 2012; Rosenthal and Strange, 2003). First, the population of zip codes in each year is included. Some markets attract more travelers than others, and then multi-unit hotel owners are willing to establish a new hotel in markets with high demands for travel. This study might control for this effect by using the zip code population. The population information of zip codes is from the ACS 2010-2016. Second, zip code mean income is from the ACS 2010-2016. Third, the number of restaurants in a market might attract more travelers because of the convenience. The CBP 2010-2016 provides us the information about the number of establishments and the number of food and accommodation in each zip code. This research calculates the percentage of the establishment of the food services sector in the zip code in each year to measure the potential demand for customers. The market structure also affects the entry pattern

of hotels. Kalnins and Chung (2004) show that the presence of incumbent hotels in a market affects hotel owners' incentives to enter. This study includes the number of independent hotels, the number of low-end hotels, and the number of high-end hotels for each zip code.

### 4.5.2 Results

Table 4.5 assesses how the entry patterns of new hotels are affected by multi-unit ownership and other variables at the establishment level. The results are based on the sample of 1,473 entry into a cluster, 994 entry into a high-end cluster, 1083 entry into a low-end cluster without members, and 484 entry into a low-end cluster with members. Column (1) shows that the ownership structure of multi-unit operators has a positive and significant coefficient on the entry pattern of hotels, supporting Hypothesis 1. The value of F-test is lower than 0.05, which means that this model can explain a significant portion of the entry. The size of multi-unit ownership effect is around 22 times as large as the mean of the entry. This result implies that multi-unit owners are more likely to establish a new hotel in a market compared to single-unit owners because they are typically more experience or successful in their businesses. This result is consistent with the finding from Kalnin and Lafontaine (2004) who show that multi-unit owners are more likely to set up a new establishment in a market. The average distance to existing hotels has a positive coefficient, which implies that the further distance from the incumbent increases the possibility to enter. This result is consistent with the findings from the previous literature, which claims that firms choose to locate far from each other in order to reduce the direct competition, which in turn induces a higher entry (Baum and Mezias, 1992; Kalnins, 2016; Kalnins

and Chung, 2004). The number of high-end hotels has a negatively and statistically significant coefficient, which means that the market characterized by a high count of high-end hotels will deter entrants from this market. The possible explanation is the market with a high count of high-end hotels might be fully saturated because it already attracts too many hotels both in low-end and high-end. The negative externality from compeition outweighs the positive externality from agglomeration spillovers and so the effect of the number of high-end hotels has a negative impact on the entry of hotels.

Column (2) also shows that the ownership structure of multi-unit owners has a positive and significant coefficient on the entry pattern when the cluster is characterized by high counts of high-end hotels. The value of F-test is lower than 0.05, which means that this model can explain a significant portion of the entry when the cluster is characterized by high counts of high-end hotels. The size of multi-unit ownership effect is 123 times as large as the mean of the entry into a high-end cluster. The result does not reject Hypothesis 1. This implies that multi-unit owners would like to establish a new low-end hotel in a market characterized by high counts of high-end hotels. The entrant of low-end hotels can enjoy a number of benefits from located close to high-end hotels. This result is consistent with the findings from the traditional agglomeration literature that hotels tend to collocate together to enjoy agglomeration benefits (Chung and Kalnins, 2001; Kalnins and Chung, 2004). The differentiation-based agglomeration also has a positive and significant coefficient. This means that the cluster with more high-end hotels attracts more hotels to enter this market. Mean income has a negative impact on the entry of hotels. The market becomes saturated

as an increase in mean income in a community. The localized competition reduces the likelihood of the entry of hotels.

Column (3) shows that there is an insignificant effect on the entry pattern when the cluster characterized by a high count of low-end hotels. Unlike Kalinis and Chung (2004) find that a high-end hotel will choose not to enter a market with high counts of low-end hotels, the result has an opposite finding, which is shown in Column (4). The value of F-test is lower than 0.05, which means that this model can explain a significant portion of the entry when the cluster characterized by high counts of low-end cluster with members. The size of multi-unit ownership effect is around 2000 times as large as the mean of entry into a low-end cluster with members. Therefore, Hypothesis 1 is supported. The multi-unit owner will establish a new high-end hotel into a cluster with more low-end hotels as long as one of the incumbents belongs to the multi-unit owner. The possible explanation is that hotels operated by multi-unit owners may benefit from the other members within the same owners. The proximity and contiguity to their members both contribute positively to the likelihood for multi-unit owners to operate a new high-end hotel in a less differentiated market. Multi-unit owners have relevant experience in the markets with similar demographic characteristics. Becasue of the demographic similarity, multi-unit onwers can fully utilize the local knowledge and capabilities to enhance a competitive advantage of increasing the likelihood of entry. The increased market power that results from a cluster of establishments outweighs the cost from located in a less differentiated market.

Insert Table 4.5 Here

Table 4.6 shows the results from conditional logit models at a multi-unit level. Looking at columns (1) and (2), multi-unit owners who operate multiple cross-tier/same-chain hotels appear to agglomerate in a cluster with more high-end hotels. The values of F-test in both models are lower than 0.05, which means that the models can explain a significant portion of the entry pattern. The sizes of product differentiation effect are 37 and 255 times as large as the means of entry and entry into a high-end cluster separately. The results do support Hypothesis 2, leading to a rejection of Hypothesis 3. From columns (3) and (4), the results show that the multi-unit owner who operates multiple cross-tier/same-chain hotels is more likely to establish a high-end hotel in a cluster if one of the incumbents belongs to the multi-unit owner, supporting Hypothesis 2 and rejecting Hypothesis 3. The values of F-test in both models are lower than 0.05, which means that the models can explain a significant portion of the entry pattern. The size of product differentiation effect is 98 times as large as the mean of entry into a low-end cluster with members. This implies that product differentiation undertaken by the multi-unit owner may reduce the negative externality from the agglomeration with a high count of low-end hotels.

Overall, the number of hotels has a negative and significant coefficient on the entry pattern of hotels. The findings replicate the main result from the previous literature regarding the effects of competition on entry behavior: firms will choose not to agglomerate in a market where there exist many incumbents (Baum and Mezias, 1992; Shaver and Flyer, 2000). The number of independent hotels has a positive and significant coefficient on columns (1) and (2). Population has a positive and significant impact on the entry pattern of hotels while mean income has a negative

and significant influence on the entry pattern of hotels in columns (1) and (3).

Insert Table 4.6 Here

## 4.6   Conclusion

This study hypothesizes how the effects of ownership structure and product differentiation influence the evolution of the cluster. Cluster together will make competition among firms more intense, while the collocation of firms can generate gains. For example, with heightened demands, agglomeration helps consumers to first establish firms' existence and then to evaluate the options presented by the collocation of firms, which increases visitation and subsequent purchases. In addition, the ownership structure of firms in a market might influence the competitive environment of the market. The market structure with a number of single-unit owners becomes more competitive than that with a few of multi-unit owners.

First, this study assesses the effect of multi-unit owners on the entry pattern of hotels at an establishment level. The literature on agglomeration shows that high-end firms avoid markets with high counts of incumbent firms (Shaver and Flyer, 2000), but only when those incumbents are primarily low-end firms (Kalnins and Chung, 2004). When a market includes high counts of high-end firms, the findings show that the market attracts low-end entrants. The results also indicate that high-end hotels avoid agglomerating in the markets with high counts of low-end incumbent hotels. However, when the multi-unit owner operates multiple hotels, the findings show that the high-end entrants collocate with others as long as one of the incumbent hotels belongs to the multi-unit owner.

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Second, this research analyzes the effect of product differentiation on the entry pattern of hotels at a multi-unit level and claims that product differentiation may reduce the negative externality from the agglomeration with a high count of low-end hotels. When a market is characterized by a high count of high-end hotels, the findings indicate that the multi-unit hotel owners who operate multiple cross-tier/same-chain hotels may establish a new high-end hotel. In the case of the market with many low-end hotels, the results show that the multi-unit owner who operates multiple cross-tier/same-chain hotels may not enter because the gain from product differentiation does not overcome the loss from the market with high counts of low-end hotels. The value of the entrant of high-end hotels erodes in the proximity of low-end hotels. However, the multi-unit hotel owner who operates multiple cross-tier/same-chain hotels may enter a cluster with high counts of low-end incumbent hotels if one of the incumbents is the member of the multi-unit owner.

Overall, the findings show a general trend towards a cluster. The fact that high-end hotels avoid a low-end cluster is just an intermediary process. High-end hotels will be attracted by a low-end cluster as long as their members seek them out. These high-end hotels will prefer to locate close to their members in order to avoid the existing low-end hotels. The spillover from the member of the same owners dilutes the loss from the low-end cluster. By doing so, they will attract other hotels because this market becomes more differentiated.

The implications of the results provide industry practitioners with valuable information that can assist them in developing appropriate strategies for the entry pattern in a market. The entrant of high-end hotels will avoid locations where low-end ho-

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tels already reside. However, the owner of high-end hotels may find it beneficial to control nearby incumbents. The entrant of high-end hotels generates the agglomeration spillover which is captured by the existing member. Moreover, the control of nearby incumbents avoids activities that diminish the value of the entrant of the high-end hotel in the vicinity. Multi-unit owners have relevant experience in the markets with similar demographic characteristics, which can help fully utilize the local knowledge and capabilities to enhance competitive advantages of increasing the likelihood of entry. The increased market power that results from a cluster of establishments outweighs the cost from located in a less differentiated market. As a result, firm managers must do more to maintain and benefit from the competitive advantage in an environment. They must focus on product market strategies to appropriate benefits from the spillovers when in a competitive environment.

## Table 4.1: Descriptive statistics (N = 23,806)

| | Mean | S.D. | (1) | (2) | (3) |
|---|---|---|---|---|---|
| (1) Entry | .014 | .120 | 1.000 | | |
| (2) Entry into a high-end cluster | .006 | .082 | 0.677 | 1.000 | |
| (3) Entry into a low-end cluster | .007 | .085 | 0.706 | -0.007 | 1.000 |
| (4) Entry into a low-end cluster with members | .002 | .050 | 0.414 | -0.004 | 0.587 |
| (5) Multi-unit** | .035 | .186 | 0.133 | 0.074 | 0.112 |
| (6) The number of hotels* | 16.384 | 11.902 | 0.030 | 0.020 | 0.028 |
| (7) The average distance to incumbents* | 1.276 | .498 | 0.006 | 0.003 | 0.010 |
| (8) The differentiation-based agglomeration* | 1.616 | .787 | 0.028 | 0.027 | 0.020 |
| (9) The number of independent hotels** | 3.276 | 3.418 | -0.008 | -0.002 | -0.008 |
| (10) The number of low-end hotels** | 5.264 | 3.631 | 0.011 | 0.016 | 0.004 |
| (11) The number of high-end hotels** | 1.647 | 3.252 | 0.029 | 0.010 | 0.034 |
| (12) Population** | 10,508.73 | 6,395.624 | 0.011 | 0.013 | 0.006 |
| (13) Mean income** | 67,603.89 | 26,737.84 | 0.016 | -0.004 | 0.027 |
| (14) The percentage of food and restaurant sectors** | .012 | .007 | -0.004 | -0.003 | -0.003 |

*: The market boudary is defined as a radius of 3 miles.

**: The market boundary is defined as zip code level.

## Table 4.2: Descriptive statistics (continued)

| | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (4) | 1.000 | | | | | | | | | | |
| (5) | 0.204 | 1.000 | | | | | | | | | |
| (6) | 0.027 | 0.043 | 1.000 | | | | | | | | |
| (7) | 0.008 | 0.020 | 0.320 | 1.000 | | | | | | | |
| (8) | 0.033 | 0.034 | 0.344 | 0.125 | 1.000 | | | | | | |
| (9) | -0.008 | 0.023 | 0.248 | 0.032 | -0.388 | 1.000 | | | | | |
| (10) | 0.005 | 0.041 | 0.282 | -0.019 | 0.110 | 0.288 | 1.000 | | | | |
| (11) | 0.044 | 0.045 | 0.582 | 0.013 | 0.471 | 0.035 | 0.174 | 1.000 | | | |
| (12) | 0.028 | 0.053 | 0.056 | 0.270 | 0.249 | -0.035 | 0.285 | 0.011 | 1.000 | | |
| (13) | 0.032 | 0.022 | 0.017 | 0.069 | 0.421 | -0.227 | -0.179 | 0.196 | 0.132 | 1.000 | |
| (14) | 0.010 | 0.035 | 0.068 | -0.062 | -0.005 | 0.246 | 0.043 | 0.034 | -0.092 | 0.137 | 1.000 |

## Table 4.3: Summary statistics in the multiunit level (N = 680)

| | Mean | S.D. | (1) | (2) | (3) | (4) |
|---|---|---|---|---|---|---|
| (1) Entry | .126 | .332 | 1.000 | | | |
| (2) Entry into a high-end cluster | .058 | .235 | 0.657 | 1.000 | | |
| (3) Entry into a low-end cluster | .085 | .279 | 0.802 | 0.214 | 1.000 | |
| (4) Entry into a low-end cluster wih members | .044 | .205 | 0.564 | 0.159 | 0.703 | 1.000 |
| (5) Product differentiation | .540 | .730 | -0.001 | -0.004 | 0.023 | 0.030 |
| (6) The number of hotels | 19.611 | 10.360 | 0.000 | -0.036 | 0.039 | 0.052 |
| (7) The average distance to incumbents | 1.348 | .334 | -0.070 | -0.030 | -0.046 | -0.016 |
| (8) The differentiation-based agglomeration | 1.778 | .664 | -0.017 | -0.025 | 0.044 | 0.094 |
| (9) The number of independent hotels | 12.348 | 27.399 | 0.004 | 0.031 | 0.010 | -0.006 |
| (10) The number of low-end hotels | 23.225 | 58.359 | 0.000 | 0.032 | 0.013 | 0.001 |
| (11) The number of high-end hotels | 10.501 | 18.897 | 0.041 | 0.042 | 0.062 | 0.083 |
| (12) Population (in log) | 38.617 | 87.633 | -0.002 | 0.031 | 0.013 | -0.000 |
| (13) Mean income (in log) | 46.878 | 104.429 | -0.000 | 0.032 | 0.015 | 0.000 |
| (14) The percentage of food and restaurant sectors | .011 | .005 | 0.007 | -0.036 | 0.020 | 0.042 |

## Table 4.4: Summary statistics in the multiunit level (continued)

| | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|---|---|---|
| (5) | 1.000 | | | | | | | | | |
| (6) | -0.071 | 1.000 | | | | | | | | |
| (7) | -0.006 | 0.242 | 1.000 | | | | | | | |
| (8) | -0.028 | 0.475 | 0.203 | 1.000 | | | | | | |
| (9) | -0.101 | 0.048 | -0.036 | -0.064 | 1.000 | | | | | |
| (10) | -0.088 | 0.041 | -0.019 | 0.043 | 0.972 | 1.000 | | | | |
| (11) | -0.094 | 0.368 | -0.047 | 0.365 | 0.757 | 0.814 | 1.000 | | | |
| (12) | -0.085 | 0.016 | -0.011 | 0.052 | 0.959 | 0.990 | 0.820 | 1.000 | | |
| (13) | -0.083 | 0.018 | -0.017 | 0.052 | 0.959 | 0.990 | 0.823 | 0.999 | 1.000 | |
| (14) | -0.036 | 0.060 | 0.067 | -0.075 | 0.077 | 0.035 | -0.007 | 0.013 | 0.015 | 1.000 |

# Table 4.5: Conditional logit results: split by entry patterns

| | Entry | Entry into a high-end cluster | Entry into a low-end cluster | |
| --- | --- | --- | --- | --- |
| | | | Without members | With members |
| | (1) | (2) | (3) | (4) |
| Multi-unit | .307* | .740*** | -.048 | 4.346** |
| | (.171) | (.210) | (.374) | (1.924) |
| The number of hotels | .003 | .000 | -.009 | .015 |
| | (.011) | (.013) | .025 | (.054) |
| The average distance | .823*** | .687* | 1.393** | 1.409 |
| to incumbents | (.311) | (.377) | (.551) | (1.438) |
| The differentiation-based | .213 | 1.332*** | -.626** | -.761 |
| agglomeration | (.164) | (.330) | (.293) | (.729) |
| The number of independent | .005 | .026 | -.003 | .011 |
| hotels | (.030) | (.046) | (.062) | (.129) |
| The number of low-end hotels | .048 | .053 | .098* | .041 |
| | (.030) | (.046) | (.053) | (.224) |
| The number of high-end hotels | -.066** | -.112** | -.019 | .091 |
| | (.032) | (.053) | (.028) | (.094) |
| Population (in log) | -.101 | -.192 | -.319 | .966 |
| | (.113) | (.255) | (.204) | (.634) |
| Mean income (in log) | .075 | -.782* | .792* | 2.343 |
| | (.429) | (.450) | (.479) | (1.744) |
| The percentage of food and | -20.782 | -10.614 | -23.066 | -111.658 |
| restaurant sectors | (14.796) | (23.303) | (35.090) | (91.694) |
| Year fixed effects | Yes | Yes | Yes | Yes |
| N | 1,473 | 994 | 1,083 | 484 |
| Pseudo $R^2$ | 0.27 | 0.32 | 0.24 | 0.52 |
| Pseudolikelihood | -423.798 | -218.535 | -230.993 | -62.489 |

## Table 4.6: Conditional logit results at multiunit levels

| | Entry | Entry into a high-end cluster | Entry into a low-end cluster | |
|---|---|---|---|---|
| | | | Without members | With members |
| | (1) | (2) | (3) | (4) |
| Production differentiation | 4.674*** | 14.823** | 7.607 | 12.335** |
| | (1.626) | (6.756) | (12.474) | (6.283) |
| The number of hotels | -1.425*** | -1.364** | -1.004*** | -.787*** |
| | (.348) | (.546) | (.317) | (.287) |
| The average distance | -.244 | -.892 | -4.309 | -3.058 |
| to incumbents | (2.661) | (5.381) | (6.729) | (5.612) |
| The differentiation-based | 1.482 | .044 | 2.910 | 1.426 |
| agglomeration | (2.776) | (4.690) | (3.196) | (2.969) |
| The number of independent | .335** | .531** | .135 | .204 |
| hotels | (.138) | (.271) | (.146) | (.152) |
| The number of low-end hotels | -.029 | -.101 | -.015 | -.071 |
| | (.069) | (.087) | (.075) | (.119) |
| The number of high-end hotels | -.092 | -.113 | -.111 | .224 |
| | (.128) | (.145) | (.121) | (.373) |
| Population (in log) | 2.508*** | 1.305 | 1.519* | 1.175 |
| | (.759) | (1.186) | (.878) | (.759) |
| Mean income (in log) | -2.036*** | -1.017 | -1.210* | -.915 |
| | (.640) | (1.020) | (.698) | (.581) |
| The percentage of food and | -35.408 | -43.190 | -41.666 | 19.308 |
| restaurant sectors | (94.327) | (145.520) | (142.765) | (145.960) |
| N | 257 | 137 | 179 | 120 |
| Pseudo $R^2$ | 0.37 | 0.42 | 0.28 | 0.26 |
| Pseudolikelihood | -55.211 | -25.716 | -43.983 | -29.240 |

## Table 4.7: Entry patterns for each year (establishment levle)

| | Year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Entry | 32 | 47 | 91 | 39 | 73 | 41 | 27 |
| Entry into a high-end cluster | 12 | 27 | 63 | 14 | 20 | 20 | 6 |
| Entry into a low-end cluster | 20 | 20 | 24 | 25 | 50 | 19 | 18 |
| Entry into a low-end cluster with members | 8 | 6 | 4 | 15 | 18 | 6 | 4 |

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# Chapter 5

# Conclusion and Future Research

These three essays, taken together, provide a more complete picture of the relationship among agglomeration, strategic orientation, and ownership structure, and in particular, consider the relationship between strategic patterns and strategic outcomes in the U.S. lodging industry. Much research has been focused on each perspective of issues, but little work has been done on the outcomes from the interaction. The findings in the three essays give insights into the decisions that hotel owners make and the results of those decisions.

Agency theory claims that franchisees have stronger incentives to operate the establishments more efficiently than the managers of the establishments owned by franchisors. Previous work has assumed a constant effect of franchising across all levels of product/service quality by pooling the establishments of different quality tiers (Kosova et al., 2013; Vroom and Gimeno, 2007). However, managerial incentives are likely different based on the brand service level (Kalnins, 2017), and business models affect firms' possibilities to create and capture values (Amit and Zott, 2001). The choices of business models and product market strategies affect the performance of firms (Sveum and Sykuta, 2019; Yin and Zajac, 2004; Zott and Amit, 2008). In the first essay, I analyze the possibility that the relationship between performance and

ownership structure may vary based on firm-level attributes such as brand tiers in the U.S. lodging industry. More generally, the possibility that positive and negative franchising effects can coexist within the same industry at different brand segments. I examine the effect of franchising in the aggregate as well as for each individual quality tier. I also estimate the effects both with and without controls for the endogeneity of the franchise treatment decision. First, contrasting with the results by Kosova et al. (2013), my results indicate that franchised establishments are associated with higher performance outcomes among hotels both with and without controlling the endogenous selection. Second, I find the effects of franchising and multi-unit franchising have different benefits based on the product quality attributes of the lodging establishments.

The effect of franchising on performance has mixed findings in prior studies. The points to heterogeneity across hotel quality tiers are often not considered in the existing literature. My study not only highlights the value of rebalancing research attention from pooling quality tiers to across quality tiers but also raises the question that whether there is an alignment between the performance across these two levels of analyses. My results suggest greater care needs be given to the studies of the lodging industry to control for these differences.

The location choice of firms is not randomly distributed in a market (Marshall, 1920). When it comes to the location decision, firms face two opposite incentives–choosing product positioning close to competitors' one to capture more consumers and locating farther from their rivals to reduce price competition–which generate the mixed results. In the second essay, I consider the two-dimension Hotelling model

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which is the choices on location and quality (or brand). Several types of configurations are possible, ranging from firms choosing the same level on all dimensions (no differentiation, i.e., min-min), to firms choosing as much separation as possible on all dimensions (maximal differentiation, i.e., max-max), and to firms choosing an "in-between" degree of differentiation (maximal differentiation on one dimension and minimal differentiation on the other, max-min). The theoretical literature is more supportive of max-min equilibria (Ansari et al., 1998; Irmen and Thisse, 1998; Neven and Thisse, 1990), however, the empirical literature shows mixed findings (Elizalde, 2013; Iyer and Seetharaman, 2008; Netz and Taylor, 2002; Watson, 2009).

The literature on the two-dimension Hotelling model concludes that firms choose to maximally differentiate on the dominant characteristic and minimally differentiate on the dominated characteristic. I argue that, assuming the geographic location is the dominant characteristic and the brand is the dominated characteristic, the model implies that multi-unit owners will structure their portfolios of establishments to be geographically differentiated while choosing less differentiated brands. My results show a max-min equilibrium where multi-unit owners who operate same-tier/cross-chain hotels become less differentiated in the portfolio of brands as geographic differentiation increases. My explanation is that multi-unit owners want to capture more market share by the dispersion of the location pattern of hotels. Alternatively, I argue that, if the geographic location is the dominated characteristic and the brand is the dominant characteristic, the model implies that multi-unit owners will locate their establishments close to each other and choose highly differentiated brands. My results show a max-min (or min-max) equilibrium where multi-unit owners who operate

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cross-tier/same-chain hotels locate their establishments together when brand differentiation is large enough. I interpret firms' differentiation in brands is large enough to soften competition.

One suggestion can be made based on the results of the second essay. While the previous studies on the two-dimension Hotelling model have not distinguished between two types of differentiations, the study highlights this distinction is important because they are compositionally different so that they can provide theoretically different implications. Each differentiation can have different magnitude/weight on one dimension. My results provide insights into the strategic motivations of multi-unit owners and the relative dominance of place versus market positioning in those decisions and show that the location decision of multi-unit firms is more complex. The location pattern of multi-unit firms varies based on their product positioning. This situation opens a possibility that multi-unit firms strategically choose their location pattern differently to maximize the geographic pattern in the presence of horizontal differentiation and to minimize the geographic pattern in the presence of vertical differentiation. My research shows that different types of product differentiations are important factors in the location decisions of multi-unit firms.

The third essay addresses how the choices of ownership structure and product differentiation affect the evolution of the cluster. On the one hand, agglomeration would create a positive externality, for example, heightened demands, consequently attracting more firms to the specific cluster (Peiro et al., 2015). On the other hand, agglomeration might induce localized competition among firms as a negative externality, eventually reducing the survival rates of incumbents and attracting fewer firms to

the specific cluster (Baum and Mezias, 1992; Shaver and Flyer, 2000). The literature on agglomeration claims that the agglomeration effect is heterogeneous among firms and this effect is based on product heterogeneity between entrants and incumbents nearby. Shaver and Flyer (2000) show that high-resource firms avoid agglomeration opportunities and low-resource firms seek them out. Kalnins and Chung (2004) find that high-resource firms avoid markets with high counts of incumbent firms, but only when those incumbents are low-resource firms. In addition, the ownership structure of firms in a market might influence the competitive environment of the market. The market structure with a number of single-unit owners becomes more competitive than that with a few of multi-unit owners.

First, I find that high-end hotels avoid to agglomerate in the markets with high counts of low-end incumbent hotels. However, when the multi-unit owner operates multiple hotels, my results indicate that the high-end entrants collocate with others as long as one of the incumbent hotels belongs to the multi-unit owner. Second, as the market with many low-end hotels, my findings indicate that the multi-unit hotel owner who operates multiple cross-tier/same-chain hotels may not enter. That is, the gain from product differentiation does not outweigh the loss from the market with high counts of low-end firms. However, the multi-unit hotel owner who operates multiple cross-tier/same-chain hotels may enter a cluster with high counts of low-end incumbent hotels if one of the incumbents is the member of the multi-unit owner.

Overall, my findings show a general trend towards a cluster. The fact that high-end hotels avoid a low-end cluster is just an intermediary process. High-end hotels will be attracted by a low-end cluster as long as their members seek them out. These

high-end hotels will prefer to locate close to their members in order to avoid the existing low-end hotels. The spillover from the member of the same owners dilutes the loss from the low-end cluster. By doing so, they will attract other hotels because this market becomes more differentiated.

The implications of my findings provide industry practitioners with valuable information that can assist them in developing appropriate strategies for the entry pattern in a market. The entrant of high-end hotels will avoid locations where low-end hotels already reside. However, the owner of high-end hotels may find it beneficial to control nearby incumbents. The entrant of the high-end hotel generates the agglomeration spillover which is captured by the existing member. Moreover, the control of nearby incumbents avoids activities that diminish the value of the entrant of the high-end hotel in the vicinity. As a result, firm managers must do more to maintain and benefit from competitive advantages in an environment. They must focus on strategies to appropriate benefits from the spillover when entering in a competitive environment.

In the intermediate future, my research agenda will be heavily focused on the extension of essay III. Agglomeration theory suggests that firms in the geographical cluster lead to higher performance outcomes because of heightened demands. Product differentiation leads firms to a higher level of performance because differentiation can reduce direct price competition with other competitors. Franchisees with multiple establishments perform better because of their higher flexible ability to react to market uncertainties than single-unit franchisees. My extension is to address the most fundamental question of whether the joint effects of agglomeration and multi-unit franchising, as well as strategic orientation, improves performance at the establish-

ment level. Very little research addresses the fundamental question because of the lack of quality data. Few data sources exist that provide information on inputs and outputs for a wide variety of establishments. I will test the theoretical predictions on whether or not hotels' performance heightens as the synergistic effects of agglomeration, strategic orientation, and multi-unit franchising.

Another extension is to examine how the geographic and product diversification of establishments contribute to tacit collusion, and how the ownership structure of establishments mitigates those effects. Multi-market competition is a common phenomenon in the U.S. lodging industry. It occurs when firms compete against their rivals across different markets. Multi-market contact, therefore, may induce a sort of mutual forbearance between multi-market firms by reducing their incentives to engage in aggressive competition in the markets in which the rivals are present (Bernheim and Whiston, 1990; Edwards, 1955). A critical dimension of the multi-market contact literature, however, is the ownership structure of establishments across markets. Although two competing hotel brands may compete in multiple markets, the hotels in those markets may not be commonly owned across markets. I plan to study the moderating effect of ownership structure on the relationship between multi-market contact and firms' survivals.

# Bibliography

[1] Abu-Aligah, K.M. (2012). Differentiation and organizational performance: Empirical evidence from Jardanian companies. *Journal of Economics*, 3(1), 7-11.

[2] Alcacer, J., and Chung, W. (2014). Location strategies for agglomeration economies. *Strategic Management Journal*, 35, 1749-1761.

[3] Alcacer, J., Dezso, C., and Zhao, M. (2015). Location choices under strategic interactions. *Strategic Management Journal*, 36, 197-215.

[4] Alcacer, J., and Zhao, M. (2012). Local R&D strategies and multilocation firms: The role of internal linkages. *Management Science*, 58(4), 734-753.

[5] Amit, R., and Zott, C. (2001). Value creation in e-business. *Strategic Management Journal*, 22, 493-520.

[6] Anderson, E. (1985). The salesperson as outside agent or employee: A transaction cost analysis. *Marketing Science*, 4, 234-254.

[7] Ansari, A., Economides, N., and Steckel, J. (1998). The max-min-min principle of product differentiation. *Journal of Regional Science*, 38(2), 207-230.

[8] d' Aspremont, C., Gabszewicz, J., and Thisse, J.-F. (1979). On Hotelling's stability in competition. *Econometrica*, 47, 1145-1150.

[9] Assaf, A., and Cvelbar, K. (2011). Privatization, market competition, international attractiveness, management tenure and hotel performance: Evidence from Slovenia. *International Journal of Hospitality Management*, 30(2), 391-397.

[10] Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.

[11] Bates, T. (1998). Survival patterns among newcomers to franchising. *Journal of Business Venturing*, 13, 113-130.

[12] Baum, J., and Haveman, H. (1997). Love the neighbor? Differentiation and spatial agglomeration in the Manhattan hotel industry, 1898-1990. *Administrative Science Quarterly*, 42, 304-338.

[13] Baum, J., and Mezias, S. (1992). Localized competition and organizational failure in the Manhattan hotel industry, 1898-1990. *Administrative Science Quarterly*, 37, 580-604.

[14] Baum, J., Calabrese, T., and Silverman, B. (2000). Don't go it alone: Alliance network composition and startups' performance in Canadian biotechnology. Strategic Management Journal, 21(3), 267-294.

[15] Ben-Aliva, M., De Palma, A., and Thisse, J.-F. (1989). Spatial competition with differentiated products. *Regional Science and Urban Economics*, 19, 87-102.

[16] Bernheim, B., and Whiston, M. (1990). Multimarket contact and collusive behavior. *RAND Journal of Economics*, 21(1), 1-26.

[17] Botti, L., Briec, W., and Cliquet, G. (2009). Plural forms versus franchise and company-owned systems: A DEA approach of hotel chain performance. *Omega*, 37(3), 566-578.

[18] Bradach, J. (1997). Using the plural form in the management of restaurant chains. *Administrative Science Quarterly*, 42, 276-303.

[19] Brickley, J. (1999). Incentive conflicts and contractual restraints: Evidence from franchising. *Journal of Law and Economics*, 42(2), 745-774.

[20] Brickley, J., and Dark, F. (1987). The choice of organizational form: The case of franchising. *Journal of Financial Economics*, 18, 401-420.

[21] Brickley, J., Dark, F., and Weisbach, M. (1991). An agency perspective of franchising. *Financial Management*, 20, 27-35.

[22] Canina, L., Enz, C., and Harrison, J. (2005). Agglomeration effects and strategic orientations: Evidence from the U.S. lodging industry. *Academy of Management Journal*, 48(4), 565-581.

[23] Carvell, S., Canina, L., and Sturman, M. (2016). A comparison of the performance of brand-affiliated and unaffiliated hotel properties. *Cornell Hospitality Quarterly*, 57(2), 193-201.

[24] Caves, R., and Murphy, W. (1976). Franchising: Firms, markets, and intangible assets. *Southern Economic Journal*, 42(4), 572-586.

[25] Celen, B., and Thomas, C. (2009). *Organizational form, information asymmetry, and market prices.* Working paper.

[26] Chakrabarty, D., Chaudhuri, A., and Spell, C. (2002). Information structure and contractual choice in franchising. *Journal of Institutional and Theoretical Economics*, 158, 638-663.

[27] Chenhall, R., and Langfield-Smith, K. (1998). The relationship between strategic priorities, management techniques and management accounting: An empirical investigation using a system approach. *Accounting, Organizations and Society*, 23(3), 243-264.

[28] Chung, W., and Kalnins, A. (2001). Agglomeration effects and performance: A test of the Texas lodging industry. *Strategic Management Journal*, 22(10), 969-988.

[29] Conlin, M. (2004). *The effect of franchising on competition: An empirical analysis.*

[30] Conlin, M., and Kadiyali, V. (2006). Entry-deterring capacity in the Texas lodging industry. *Journal of Economics and Management Strategy*, 15, 167-185.

[31] Darr, E., Argote, L., and Epple, D. (1995). The acquisition, transfer, and depreciation of knowledge in service organizations: Productivity in franchises. *Management Science*, 41(11), 1750-1762.

[32] Delgado, M., Porter, M., and Stern, S. (2010). Clusters and entrepreneurship. *Journal of Economic Geography*, 10, 495-518.

[33] de Palma, A., Ginsburgh, V., Papageorgiou, Y., and Thisse, J.-F. (1985). The principle of minimum differentiation holds under sufficient heterogeneity. *Econometrica*, 53(4), 767-781.

[34] Dranove, D., Gron, A., and Mazzeo, M. (2003). Differentiation and competition in HMO markets. *Journal of Industrial Economics*, 51(4), 433-454.

[35] Dos Santos Ferreira, R., and Thisse, J.-F. (1996). Horizontal and vertical differentiation: The Launhardt model. *International Journal of Industrial Organization*, 14(4), 485-506.

[36] Dudey, M. (1990). Competition by choice: the effect of consumer search on firm location decisions. *American Economic Review*, 1092-1104.

[37] Eaton, B., and Lipsey, R. (1975). The principle of minimum differentiation reconsidered: Some new developments in the theory of spatial competition. *Review of Economic Studies*, 42(1), 27-49.

[38] Economides, N. (1989). Quality variations and maximal variety differentiation. *Regional Science and Urban Economics*, 19, 21-29.

[39] Edwards, C. (1955). Conglomerate bigness as a source of power. In: *NBER Conference Report: Business Concentration and Price Police*. Princeton, NJ: Princeton University Press, pp. 331-352.

[40] Elizalde, J. (2013). Competition in multiple characteristics: An empirical test of location equilibrium. *Regional Science and Urban Economics*, 43, 938-950.

[41] Enz, C., Canina, L., and Liu, Z. (2008). Competitive dynamics and pricing behavior in U.S. hotels: The role of co-location. *Scandinavian Journal of Hospitality and Tourism*, 8(3), 230-250.

[42] Enz, C., Canina, L., and Palacios-Marques, D. (2013). The relationship between new venture entry mode and firm performance. *International Entrepreneurship and Management Journal*, 9(2), 129-145.

[43] Enz, C., Peiro-Signes, A., Segarra-Ona, M. (2014). How fast do new hotels ramp up performance? *Cornell Hospitality Quarterly*, 55(2), 141-151.

[44] Fischer, J., and Harrington, J. (1996). Product variety and firm agglomeration. *RAND Journal of Economics*, 27(2), 281-309.

[45] Freedman, M., and Kosova, R. (2012). Agglomeration, product heterogeneity and firm entry. *Journal of Economic Geography*, 12(3), 601-626.

[46] Freedman, M., and Kosova, R. (2014). Agency and compensation: Evidence from the hotel industry. *Journal of Law, Economics, and Organization*, 30(1), 72-103.

[47] Fujita, M., and Thisse, J.-F. (2002). *Economics of agglomeration: Cities, industrial location, regional growth.* Cambridge, England: Cambridge University Press.

[48] Gabszewicz, J., and Thisse, J.-F. (1979). Price competition, quality and income disparities. *Journal of Economic Theory*, 20, 340-359.

[49] Garg, V. (2013). Does multi-unit franchising aid differentiation? An exposition. *Journal of Applied Management and Entrepreneurship*, 18(1), 3-25.

[50] Graf, N. (2011). Market structure and demand-side substitutability of chained urban hotel segments. *International Journal of Hospitality Management*, 30, 82-90.

[51] Grunhagen, M., and Mittelstaedt, R. (2002). Is bigger better? The anticipation of scale efficiencies and decision participation as motivations for aspiring multi-unit franchisees. *International Journal of Entrepreneurial Behavior & Research*, 8(3), 188-200.

[52] Hauser, J. (1988). Competitive price and positioning strategies. *Marketing Science*, 7(1), 76-91.

[53] Head, K., Ries, J., and Swenson, D. (1995). Agglomeration benefits and location choice: Evidence from Japanese manufacturing investments. *Journal of International Economics*, 38, 223-247.

[54] Hollenbeck, B. (2017). The economic advantage of chain organization. *RAND Journal of Economics*, 48(4), 1103-1135.

[55] Hotelling, H. (1929). Stability in competition. *Economic Journal*, 39, 41-57.

[56] Hoy, F. (1994). The dark side of franchising. *International Small Business Journal*, 12(2), 26-38.

[57] Hwang, S.-N., and Chang, T.-Y. (2003). Using data envelopment analysis to measure hotel managerial efficiency change in Taiwan. *Tourism Management*, 24, 357-369.

[58] Ingram, P., and Baum, J. (1997a). Opportunity and constraint: Organizational learning from operating and competitive experience. *Strategic Management Journal*, 18, 75-98.

[59] Ingram, P., and Baum, J. (1997b). Chain affiliation and the failure of Manhattan hotels, 1898-1980. *Administrative Science Quarterly*, 42(1), 68-102.

[60] Ingram, P., and Roberts, P. (2000). Friendships among competitors in the Sydney hotel industry. *American Journal of Sociology*, 106, 387-423.

[61] Irmen, A., and Thisse, J.-F. (1998). Competition in multi-characteristics spaces: Hotelling was almost right. *Journal of Economic Theory*, 78(1), 76-102.

[62] Iyer, G., and Seetharaman, P. (2008). Too close to be similar: Product and price competition in retail gasoline markets. *Quantitative Marketing and Economics*, 6, 205-234.

[63] Jensen, M., and Meckling, W. (1976). Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics*, 3, 305-360.

[64] Kalnins, A. (2004). An empirical analysis of territorial encroachment within franchised and company-owned branded chains. *Marketing Science*, 23(4), 476-489.

[65] Kalnins, A. (2006). Markets: The U.S. lodging industry. *Journal of Economic Perspectives*, 20(4), 203-218.

[66] Kalnins, A. (2017). Pricing variation within dual-distribution chains: The different implications of externalities and signaling for high- and low-quality brands. *Management Science*, 65(1), 139-152.

[67] Kalnins, A., and Chung, W. (2004). Resource-seeking agglomeration: A study of market entry in the lodging industry. *Strategic Management Journal,* 25(7), 689-699.

[68] Kalnins, A., and Chung, W. (2006). Social capital, geography, and survival: Gujarati immigrant entrepreneurs in the U.S. lodging industry. *Management Science*, 52(2), 233-247.

[69] Kalnins, A., and Lafontaine, F. (2004). Multi-unit ownership in franchising: Evidence from the fast-food industry in Texas. *RAND Journal of Economics*, 35, 747-761.

[70] Kalnins, A., and Mayer, K. (2004). Franchising, ownership, and experience: A study of pizza restaurant survival. *Management Science*, 50(12), 1716-1728.

[71] Kandori, M., and Matsushima, H. (1998). Private observation, communication and collusion. *Econometrica*, 66(3), 627-652.

[72] Kehoe, M. (1996). Franchising, agency problems, and the cost of capital. *Applied Economics*, 28(11), 1485-1493.

[73] Klein, B. (1995). The economics of franchise contracts. *Journal of Corporate Finance*, 2(1), 9-37.

[74] Konishi, H. (2005). Concentration of competing retail stores. *Journal of Urban Economics*, 58, 488-512.

[75] Kosova, R., Lafontaine, F., and Perrigot, R. (2013). Organizational form and performance: Evidence from the hotel industry. *Review of Economics and Statistics*, 95(4), 1303-1323.

[76] Kosova, R., and Sertsios, G. (2018). An empirical analysis of self-enforcement mechanisms: Evidence from hotel franchising. *Management Science*, 64(1), 43-63.

[77] Lafontaine, F. (1992). Agency theory and franchising: Some empirical results. *RAND Journal of Economics*, 23, 263-283.

[78] Lafontaine, F. (2014). Franchising: Directions for future research. *International Journal of the Economics of Business*, 21(1), 21-25.

[79] Lafontaine, F., and Bhattacharyya, S. (1995). The role of risk in franchising. *Journal of Corporate Finance*, 2, 39-74.

[80] Lafontaine, F., and Blair, R. (2005). *The Economics of Franchising*. Cambridge University Press, Cambridge.

[81] Lafontaine, F., and Kaufmann, P. (1994). The evolution of ownership patterns in franchise system. *Journal of Retailing*, 70(2), 97-113.

[82] Lafontaine, F., and Shaw, K. (2005). Targeting managerial control: Evidence from franchising. *RAND Journal of Economics*, 36(1), 131-150..

[83] Lafontaine, F., and Slade, M. (2007). Vertical integration and firm boundaries: The evidence. *Journal of Economic Literature*, 45(3), 629-685.

[84] Lancaster, K. (1990). The economics of product variety: A survey. *Marketing Science*, 9(3), 189-206.

[85] Lauga, D., and Ofek, E. (2011). Product positioning in a two-dimensional vertical differentiation model: The role of quality costs. *Marketing Science*, 30(5), 903-923.

[86] Lee, S. (2015). Quality differentiation and conditional spatial price competition among hotels. *Tourism Management*, 46, 114-122.

[87] Lee, S., and Jang, S. (2015). Conditional agglomeration externalities in lodging markets. *Journal of Hospitality and Tourism Research*, 39(4), 540-559.

[88] Lee, S., and Jang, S. (2017). Early mover or late mover advantage for hotels? *Journal of Hospitality and Tourism Research*, 41(1), 23-40.

[89] Ma, H. (2000). Competitive advantage and firm performance. *Competitiveness Review*, 10(2), 15-32.

[90] Marshall, A. (1920). *Principles of Economics* (8th eds). Macmillan: London, UK.

[91] Martin, R. (1988). Franchising and risk management. *American Economic Review*, 78, 954-968.

[92] Mazzeo, M. (2002). Product choice and oligopoly market structure. *RAND Journal of Economics*, 33, 221-242.

[93] Mazzeo, M. (2004). Retail contracting and organizational form: Alternatives to chain affiliation in the motel industry. *Journal of Economics and Management Strategy*, 13(4), 599-615.

[94] McCann, B., and Folta, T. (2008). Location matters: Where we have been and where we might go in agglomeration research. *Journal of Management*, 34(3), 532-565.

[95] McCann, B., and Folta, T. (2009). Demand- and supply-side agglomerations: Distinguishing between fundamentally different manifestations of geographic concentration. *Journal of Management Studies*, 46(3), 362-392.

[96] McCann, B., and Vroom, G. (2010). Pricing response to entry and agglomeration effects. *Strategic Management Journal*, 31(3), 284-305.

[97] McFadden, D. (1974). Conditional logit analysis of qualitative choice behavior. In *Frontiers in Econometrics*, Zarembka P (ed). Academic Press: New York; 105-142.

[98] Michael, S. (2000). The effect of organizational form on quality: The case of franchising. *Journal of Economic Behavior and Organization*, 43, 295-318.

[99] Morgan, N., Kaleka, A., and Katsikeas, C. (2004). Antecedents of export venture performance: A theoretical model and empirical assessment. *Journal of Marketing*, 68(1), 90-108.

[100] Netz, J., and Taylor, B. (2002). Maximum or minimum differentiation? Location patterns of retail outlets. *Review of Economics and Statistics*, 84(1), 162-175.

[101] Neven, D., and Thisse, J.-F. (1990). On quality and variety competition. *Economic Decision-Making: Games, Econometrics and Optimization*, 175-199.

[102] Norton, S. (1988a). Franchising, brand name capital, and entrepreneurial capacity problem. *Strategic Management Journal*, 9, 105-114.

[103] Norton, S. (1988b). An empirical look at franchising as an organizational form. *Journal of Business*, 61(2), 197-218.

[104] O'Donnell, J., Lee, S., and Roehl, W. (2012). Do economies of scale exist in the Atlantic City casino industry? *International Journal of Contemporary Hospitality Management*, 24(1), 62-80.

[105] O'Neill, J., and Xiao, Q. (2006). The role of brand affiliation in hotel market value. *Cornell Hotel and Restaurant Administration Quarterly*, 47(3), 1-14.

[106] Peiro-Signes, A., Segarra-Ona, M., Miret-Pastor, L., and Verma, R. (2015). The effect of tourism clusters on U.S. hotel performance. *Cornell Hospitality Quarterly*, 56(2), 155-167.

[107] Perryman, A., and Combs, J. (2012). Who should own it? An agency-based explanation for multi-outlet ownership and co-location in plural form franchising. *Strategic Management Journal*, 33, 368-386.

[108] Picone, G., Ridley, D., Zandbergen, P. (2009). Distance decreases with differentiation: strategic agglomeration by retailers. *International Journal of Industrial Organization*, 27, 463-473.

[109] Pine, R., and Phillips, P. (2005). Performance comparisons of hotels in China. *International Journal of Hospitality Management*, 24(1), 57-73.

[110] Pinske, J., and Slade, M. (1998). Contracting in space: An application of spatial statistics to discrete-choice models. *Journal of Econometrics*, 85, 125-154.

[111] Porter, M. (1980). *Competitive Strategy*. New York, Free Press.

[112] Porter, M. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance*, New York, Free Press.

[113] Porter, M. (1996). Competitive Advantage, Agglomeration Economies, and Regional Policy, *International Regional Science Review*, 19, 1-2.

[114] Reynolds, D., and Thompson, G. (2007). Multiunit restaurant productivity assessment using three-phase data envelopment analysis. *International Journal of Hospitality Management*, 26, 20-32.

[115] Ridley, D. (2008). Herding vs. Hotelling: market entry with costly information. *Journal of Economics and Management Strategy*, 17(3), 607-631.

[116] Rosenthal, S., and Strange, W. (2001). The determinants of agglomeration. *Journal of Urban Economics*, 50(2), 191-229.

[117] Rosenthal, S., and Strange, W. (2003). Geography, industrial organization, and agglomeration. *Review of Economics and Statistics*, 85, 377-393.

[118] Rushmore, S., and Baum, E. (2001). *Hotels and motels: Valuation and market studies.* Chicago, Appraisal Institute.

[119] Shammot, M. (2011). Quality management practices and their impact on organizational performance, and customer behavior. *European Journal of Economics, Finance and Administrative Science*, 34, 152-161.

[120] Shane, S. (1996). Hybrid organizational arrangements and their implications for firm growth and survival: A study of new franchisors, *Academy of Management Journal*, 39(1), 216-234.

[121] Shaver, J. (1998). Accounting for endogeneity when assessing strategy performance: Does entry mode choice affect FDI survival? *Management Science*, 44, 571-585.

[122] Shaver, J., and Flyer, F. (2000). Agglomeration economies, firm heterogeneity, and foreign direct investment in the United States. *Strategic Management Journal*, 21, 1175-1193.

[123] Skogland, I., and Siguaw, J. (2004). Are you satisfied customers loyal? *Cornell Hotel and Restaurant Administrative Quarterly*, 45(3), 221-234.

[124] Smithies, A. (1941). Optimum location in spatial competition. *Journal of Political Economy*, 49(3), 423-439.

[125] Stahl, K. (1982). Differentiated products, consumer search and locational oligopoly. *Journal of Industrial Economics*, 31(1), 97-113.

[126] Suzuki, J. (2013). Land use regulation as a barrier to entry: Evidence from the Texas lodging industry. *International Economic Review*, 54(2), 495-523.

[127] Sveum, M., and Sykuta, M. (2019). The effect of franchising on establishment performance in the U.S. restaurant industry. *Cornell Hospitality Quarterly*, 60(2), 104-115.

[128] Tabuchi, T. (1994). Two-stage two-dimensional spatial competition between two firms. *Regional Science and Urban Economics*, 24, 207-227.

[129] Tavitiyaman, P., Qu, H., and Zhang, H. (2011). The impact of industry force factors on resource competitive strategies and hotel performance. *International Journal of Hospitality Management*, 30, 648-657.

[130] Thomadsen, R. (2005). The effect of ownership structure on prices in geographically differentiated industries. *RAND Journal of Economics*, 36, 908-929.

[131] Tsang, E., and Yip, P. (2009). Competition, agglomeration, and performance of Beijing hotels. *Service Industries Journal*, 29(2), 155-171.

[132] Urtasun, A., and Gutierrez, I. (2006). Hotel location in tourism cities: Madrid 1936-1998. *Annuals of Tourism Research*, 33, 382-402.

[133] Vandenbosch, M., and Weinberg, C. (1995). Product and price competition in a two-dimensional vertical differentiation model. *Marketing Science*, 14(2), 224-249.

[134] Veendorp, E., and Majeed, A. (1995). Differentiation in a two-dimensional market. *Regional Science and Urban Economics*, 25, 75-83.

[135] Vroom, G., and Gimeno, J. (2007). Ownership form, managerial incentives, and the intensity of rivalry. *Academy of Management Journal*, 50(4), 901-922.

[136] Watson, R. (2009). Product variety and competition in the retail market for eyeglasses. *Journal of Industrial Economics*, 57(2), 217-251.

[137] Wauthy, X. (1996). Quality choice in models of vertical differentiation. *Journal of Industrial Economics*, 44(3), 345-353.

[138] Weaven, S., and Frazer, L. (2004). Multi-unit franchising: Australian revelations. In R. Stassen (Ed.) *Proceedings of the 18th International Society of Franchising Conference*. Ft. Lauderdale, FL: ISOF/NOVA Southeastern University.

[139] Weaven, S., and Frazer, L. (2007). Expansion through multiple unit franchising. *International Small Business Journal*, 25(2), 173-205.

[140] Williamson, O. (1991). Comparative economic organization: The analysis of discrete structural alternatives. *Administrative Science Quarterly*, 36(2), 269-296.

[141] Yang, Y., and Mao, Z. (2017). Do independent hotels benefit from the presence of branded ones? *Journal of Business Research*, 76, 108-117.

[142] Yang, Y., Wong, K., and Wang, T. (2012). How do hotels choose their location? Evidence from hotels in Beijing. *International Journal of Hospitality Management*, 31(3), 675-685.

[143] Yin, X., and Zajac, E. (2004). The strategy/governance structure fit relationship: Theory and evidence in franchising arrangements. *Strategic Management Journal*, 25, 365-383.

[144] Zhang, J., Lawrence, B., and Anderson, C. (2015). An agency perspective on service triads: Linking operational and financial performance. *Journal of Operations Management*, 35, 56-66.

[145] Zott, C., and Amit, R. (2008). The fit between product market strategy and business model: Implications for firm performance. *Strategic Management Journal*, 29(1), 1-26.

# VITA

Shih-Chuan Lin was born on May 14th, 1982 and he grew in Taichung, Taiwan. Shih-Chuan completed his bachelor degree in Computer Science and Information Engineering in January 2006 and his master's degree in Industrial Economics in May 2008 from Tamkang University in Taiwan. He worked as a research assistant at Tamkang University for one year and at Academia Sinica for two years after he held the obligated military service in Taiwan. Shih-Chuan moved to Austin, Texas and received a master's degree in Economics from the University of Texas at Austin in 2014. After graduation, he started work on his Ph.D. from the Department of Agricultural and Applied Economics at the University of Missouri-Columbia. Shih-Chuan successfully applied for access to restricted Census Bureau data. His research areas are industrial organization and organizational economics, while he is also interested in the relationship between strategic patterns and strategic outcomes in the lodging industry. He will work as an assistant professor in the Department of Economics at Tamkang University from August 1st, 2019.